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WPB Cuts Newsprint Use to 1941 Level

Limitation Order L-240 Effective January 1 Reduces Over-All Consumption of Print Paper By Ten Per Cent—Order Affects Both Publisher and Printer — Board Explains Need of Reduction.

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., January 6, 1943—The tonnage of print paper a newspaper publisher may use in 1943 will be 100% of the amount used by him to produce his net paid circulation in 1941 plus a 3% spoilage allowance, the War Production Board announced last week. Action was taken through the issuance of Limitation Order L-240, effective January 1, which closely follows recommendations made by the Newspaper Industry Advisory Committee at a meeting in Washington with WPB officials on December 10.

The Printing and Publishing Division of WPB estimates that the order will effect a reduction of approximately 10% in current consumption of print paper, but stressed the fact that this was an over-all estimate for the industry and by no means meant that each publisher would be cut 10%. Under the order some publishers will be cut more and some less, depending upon how they use their allotment of print paper, a matter entirely up to them. The great majority of the weeklies and the small town dailies will not be affected at all.

An order governing the use of paper in magazines, L-244, was issued at the same time as L-240. Other orders governing the use of paper in books, commercial printing, and containers are expected to follow shortly, as well as an order governing the production of all pulp and pulp products.

WPB Issues Joint Statement

W. G. Chandler, Director of the Printing and Publishing Division of WPB, and Donald J. Sterling, consultant to the chairman on the newspaper and publishing industries, made the following joint statement in connection with the issuance of the orders:

"This order we believe to be an equitable one that will meet the immediate requirements of the War Production Board for the conservation of print paper in the conduct of the war effort. It will provide a levelling off period during which newspaper publishers may gear their publications to additional cuts that may come later.

"We recognize that under the strict terms of the order some newspapers, particularly those whose circulations have increased greatly since 1941, may appear to be hard hit. As the order will be administered, however, no undue hardship will be caused any newspaper. There are established practices of appeal within WPB, and appeals under the order will be acted upon rapidly and as equitably as possible."

At the Advisory Committee meeting in Washington members were told of the reasons for the proposed curtailment. The main reason is that the estimated pulpwood available for consumption during 1943 will be approximately 20 million cords for all North America, including Canada, compared with a current consumption rate of 25 million cords a year. Shortages of manpower in the woods, tires, trucks and repair parts are primarily responsible for this estimated decrease in pulpwood supply, and in some regions, notably the Pacific Northwest, increased lumber requirements have adversely affected the production of pulpwood.

The first major step in curtailment of the production and use of paper products was taken October 31 of this year, when orders were issued simultaneously by WPB and the Canadian Wartime Prices and Trade Board. Broadly speaking, the production rates of various types of paper products, including print paper, were limited to the average operating rates of the previous six months.

Order Affects Publisher and Printer

Order L-240 restricts the newspaper publishers, but has the effect of equally curtailing the newspaper printer since in the majority of cases newspapers are printed in captive plants owned by the publishers.

Following are the major provisions of the order:

(1) "Newspaper" is defined as any publication usually recognized as a newspaper in the newspaper industry regardless of the frequency of issuance.

"Printing" means the act or process of printing, impressing, or otherwise transferring onto print paper any ink, color, pigment, mark, character or delineation.

"Publisher" means anyone issuing a newspaper.

"Print paper" means any grade or quality of paper

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Magazine Publishers Must Use Less Paper

Director General For Operations In Limitation Order L-244 Restricts Use of Any Paper in Printing Magazines to 22½ Per Cent of Amount Used in 1942 — Penalty For Violations of Order.

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., January 6, 1943 — The amount of print paper that publishers of magazines may use during 1943 was announced last week by the Director General for Operations through the issuance of Limitation Order L-244. Under this order, effective January 1, magazines are limited to 90% of the tonnage of paper used by each publisher during 1942. This reduction applies whether the publisher prints his own magazine or has it printed by a commercial printer.

Simultaneously, WPB issued Limitation Order L-240, restricting the consumption of print paper in newspapers. Other orders affecting consumption of paper in books, containers, commercial printing, and other uses, as well as an order governing production of paper, will be issued shortly.

Order L-244 provides that no magazine publisher shall use or cause to be used for his account print paper for the printing of his magazine during any calendar quarter in excess of 22½% of the amount of such paper used by him for his account during the year 1942.

Provision is made, however, that a publisher may, in any calendar quarter, use up to 15% more than his quarterly quota the excess to be deducted from the quota of the succeeding calendar quarter. It is further provided that a publisher may, in any calendar quarter, use additional print paper equivalent to the less-than-quota usage of any preceding calendar quarter.

Small Consumers Are Exempted

An exemption to the order excludes any publisher who shall use, on and after January 1, 1943, 25 tons or less of print paper in any calendar quarter.

A magazine is defined as any periodical recognized as a magazine in the industry, regardless of frequency of issue.

"Publisher" means any person issuing one or more magazines.

"Print paper" means any grade or quality of paper used in the printing of a magazine or used in the printing of material physically incorporated into a magazine.

Main reason for the curtailment of paper consumption is that the estimated pulp wood supply available for consumption during 1943 will be approximately 20 million cords for all North America, including Canada, compared with a current consumption rate of 25 million cords a year. Shortage of manpower in the woods is the primary reason for the estimated decline in pulp wood supply.

Provision is made in the order for consideration of individual appeals in cases of undue hardships.

The provisions of the order were recommended to WPB by the Magazine Industry Advisory committee. It is expected that the industry generally will be able to meet the curtailment without any appreciable effect on the appearance and content of its magazines.

Full Text of Directive Order

The order is as follows:

TITLE 32—NATIONAL DEFENSE
CHAPTER IX—WAR PRODUCTION BOARD
SUBCHAPTER B—DIRECTOR GENERAL FOR OPERATIONS
PART 3133—PRINTING & PUBLISHING
GENERAL LIMITATION ORDER L-244

The fulfillment of requirements for the defense of the United States has created a shortage of the supply of print paper for defense, for private account and for export; and the following order is deemed necessary and appropriate in the public interest and to promote the national defense:

Section 3133.15—General Limitation Order L-244.

(a) Definitions. For the purposes of this order.

(1) "Person" means any individual, partnership, association, business trust, corporation, governmental corporation or agency or any organized group of persons, whether incorporated or not.

(2) "Magazine" means any periodical recognized as a magazine in the magazine industry, regardless of frequency of issue.

(3) "Printing" means the act or process of printing, impressing or otherwise transferring onto print paper any ink, color, pigment, mark, character or delineation.

(4) "Publisher" shall include, but not by way of limitation, any person issuing one or more magazines.

(5) "Print paper" means any grade or quality of paper used in the printing of a magazine, or used in the printing of material physically incorporated into a magazine.

(6) "Base period" means the year 1942.

(7) "Director" means the Director General for Operations.

(b) General Restrictions. One and after January 1, 1943.

(1) No publisher shall use, or cause to be used for his account, print paper for the printing of his magazine or magazines, during any calendar quarter in excess of 22½% of the amount of print paper used by him or for his account, for such purpose, during the base period; provided that a publisher may, in any calendar quarter, use up to 15% more than his quarterly quota for such purpose, the excess to be deducted from the quota of the succeeding calendar quarter; and provided further, that a publisher may, in any calendar quarter, use additional print paper for such purpose, equivalent to the less-than-quota usage of any preceding calendar quarters.

(c) Exceptions. The restrictions of paragraph (b) hereof shall not apply to any publisher who shall use, on and after January 1, 1943, 25 tons or less of print paper in any calendar quarter for the printing of his magazine or magazines.

(d) Miscellaneous Provisions

(1) Applicability of Priorities Regulations. This order and all transactions affected thereby are subject to all applicable provisions of the Priorities Regulations of the War Production Board, as amended from time to time.

(2) Reports. All persons affected by this order shall execute and file with the War Production Board such reports and questionnaires as the Director shall from time to time require.

(3) Records. All persons affected by this order shall keep and preserve for not less than two years accurate and complete records concerning their inventory, use and sales of print paper, subject to the inspection of the duly authorized representative of the War Production Board.

(4) Appeals. Any appeal from the provisions of this order shall be made by filing a letter in triplicate, referring to the particular provision appealed from, stating fully the grounds of the appeal.

(5) Communications to the War Production Board. All reports required to be filed hereunder and all communications concerning this order shall, unless otherwise directed, be addressed to:

"War Production Board,
Printing & Publishing Division,
Washington, D. C. Ref: L-244"

(e) Violations. Any person who wilfully violates any provision of this order, or who, in connection with this order, wilfully concealed a material fact or furnishes false information to any department or agency of the United States is guilty of crime, and upon conviction may be punished by fine or imprisonment. In addition, any such person may be prohibited from making or obtaining further deliveries of, or from processing or using, material under priority control and may be deprived of priorities assistance.

Schweitzer Starts Pension Plans

Peter J. Schweitzer, Inc., manufacturer of cigarette, carbonizing and condenser paper, with mills at Elizabeth and Spotswood, N. J., announces the inauguration of a pension plan for its employees. Under its terms, all employees who have been with the company at least 5 years are eligible for the benefits.

Under the plan, the entire cost of which is being borne by the company, 5% of the annual compensation of eligible employees is invested in annuities for their benefit, issued by the Northwestern Life Insurance Company.

The plan also covers employees of the company who are now in the Armed Services.

The pension system is in addition to health, accident, medical, surgical, hospitalization and group life insurance now given to all employees at the company's expense.

The Schweitzer Paper Company, manufacturers of condenser paper with plants at Jersey City and Newark, N. J., and Mt. Holly Springs, Pa., has also put into effect an identical system of benefits for its employees.

Dollars and Cents Ceilings on Kraft

WASHINGTON, D. C., January 6, 1943—OPA has issued a compilation of dollars and cents ceilings on major kraft paper items as a guide and convenience to distributors and users of kraft wrapping papers.

The compilation is derived from the formula provided for this industry under Maximum Price Regulation No. 182 (Kraft Wrapping Papers and Certain Kraft Bag Papers). Merchants and distributors calculate their maximum prices for these papers by applying specified mark-ups for various quantities to the manufacturers' maximum prices, as set in this regulation.

This table of dollars and cents ceilings for middlemen is issued at the request of many distributors and consumers of kraft wrapping papers. It is believed that the compilation, representing a clarification of that section of the regulation which establishes percentage mark-ups for distributors, will be of considerable aid to the industry.

The first table sets forth the maximum prices to certain consumers; the next table sets forth the ceilings on sales to other merchants and distributors; the third lists the maximum differentials which may be added in applicable instances to prices in the preceding tables. The tables follow:

TO CONSUMERS

Basis Weight in Pounds	Less than 100 lbs.	Rolls 100 to less than 375 lbs.	375 to less than 750 lbs.	750 to less than 1500 lbs.	1500 to less than 7500 lbs.	7500 to less than 15M lbs.	15M to less than 30M lbs.	30M lbs. or more
30 Standard	8.25	6.75	6.00	5.75	5.50	5.25	5.00	4.75
30 No. 1	8.55	7.05	6.30	6.05	5.80	5.525	5.275	5.025
30 Super Standard	8.85	7.35	6.60	6.35	6.10	5.80	5.55	5.30
40 Imitation	8.00	6.50	5.75	5.50	5.25	5.00	4.75	4.50
40 Standard Unbl. Butchers	8.55	7.05	6.30	6.05	5.80	5.525	5.275	5.025
40 No. 1 Unbleached Butchers	8.85	7.35	6.60	6.35	6.10	5.80	5.55	5.30
25 Machine Glazed	9.15	7.65	6.90	6.65	6.40	6.075	5.825	5.575
		Sheets (150 sq. in. or more)						
30 Standard	8.55	7.05	6.30	6.05	5.80	5.525	5.275	5.025
30 No. 1	8.85	7.35	6.60	6.35	6.10	5.80	5.55	5.30
30 Super Standard	9.15	7.65	6.90	6.65	6.40	6.075	5.825	5.575
40 Imitation	8.25	6.75	6.00	5.75	5.50	5.25	5.00	4.75
40 Standard Unbl. Butchers	8.85	7.35	6.60	6.35	6.10	5.80	5.55	5.30
40 No. 1 Unbleached Butchers	9.15	7.65	6.90	6.65	6.40	6.075	5.825	5.575
25 Machine Glazed	9.45	7.95	7.20	6.95	6.70	6.35	6.10	5.85

TO OTHER MERCHANTS OR DISTRIBUTORS

Basis Weight in Pounds	Less than 750 lbs.	Rolls 750 to less than 1500 lbs.	1500 to less than 7500 lbs.	7500 to less than 15M lbs.	15M to less than 30M lbs.	30M lbs. or more
30 Standard	5.25	5.125	5.00	4.875	4.75	4.625
30 No. 1	5.525	5.40	5.275	5.1375	5.0125	4.8875
30 Super Standard	5.80	5.675	5.55	5.40	5.275	5.15
40 Imitation	5.00	4.875	4.75	4.625	4.50	4.375
40 Standard Unbleached Butchers	5.525	5.40	5.275	5.1375	5.0125	4.8875
40 No. 1 Unbleached Butchers	5.80	5.675	5.55	5.40	5.275	5.15
25 Machine Glazed	6.075	5.95	5.825	5.6625	5.5375	5.4125
		Sheets (150 sq. in. or more)				
30 Standard	5.525	5.40	5.275	5.1375	5.0125	4.8875
30 No. 1	5.80	5.675	5.55	5.40	5.275	5.15
30 Super Standard	6.075	5.95	5.825	5.6625	5.5375	5.4125
40 Imitation	5.25	5.125	5.00	4.875	4.75	4.625
40 Standard Unbleached Butchers	5.80	5.675	5.55	5.40	5.275	5.15
40 No. 1 Unbleached Butchers	6.075	5.95	5.825	5.6625	5.5375	5.4125
25 Machine Glazed	6.35	6.225	6.10	5.925	5.80	5.675

H. S. Dennison Reappointed Director

BOSTON, Mass., January 4, 1943—Henry S. Dennison, president of the Dennison Manufacturing Company, Framingham, Mass., was reappointed a Class C director of the Federal Reserve Bank for a period expiring December 31, 1944, at a meeting held December 31.

Rush Plastics Plant at Wisconsin Rapids

New Paper Base Product Said To Have Half Weight Of Aluminum With Nearly The Tensile Strength Of Steel—Industrial Forest Plantation Is Noteworthy Experiment—Badger Mills Give Bonus.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., January 4, 1943—As the result of high priority ratings granted by the War Production Board in Washington, the Consolidated Water Power and Paper Company has launched into fast expansion program at Wisconsin Rapids, Wis., in order to fill war orders for its new plastic product, according to announcement of George W. Mead, president.

Construction has been started on an addition 80 by 100 feet to the new large building of the Ahdawagam Paper Products Company, a converting subsidiary. It will be of concrete, brick and steel, one story with 16-foot headroom superstructure for the large machines. The building was designed by Thomas Utegaard of the Consolidated engineering department, who has created most of the plant expansion, and the construction is being supervised by George Marcoux, the company's construction superintendent. Completion is expected within sixty to ninety days.

Part of the present Ahdawagam building will be utilized in addition to the new unit so as to give ample floor space for the plastic production. This will not affect Ahdawagam's production, however, because some of its machinery is being moved back into an older wooden structure for the time being so operations can be continued on a normal basis.

Part of the new machinery has already arrived, and the remainder is on order, ready to ship or en route, according to W. F. Thiele, chief engineer. The equipment includes two 1,000-ton presses producing a plastic unit 10 by 16 feet, one 500-ton press for sheets 10 by 4½ feet, and two 150-ton presses for smaller sheets. A treating machine also will be installed to impregnate the sheets in readiness for the presses.

Production had been carried on in an experimental way using a treating machine at the Consolidated mill at Biron, Wis., and one 150-ton press.

President Mead's Statement

In his comments on the new product, President Mead said: "Several months ago we announced the discovery of a new paper base plastic which was developed in collaboration with ourselves by the U. S. Forest Products Laboratory at Madison, Wis. Further research by that laboratory and by our engineering and laboratory staffs have developed and improved our first efforts. *Fortune Magazine* in November declared that this paper plastic was 'a momentous discovery, half the weight of aluminum with nearly the tensile strength of steel.'

"This paper plastic has been thoroughly tested by army and navy authorities and upon their recommendation the War Production Board on Thursday, December 17, extended to us its approval and granted us authority to construct the building and to purchase the necessary machinery for the production of this material as a vital war essential.

"We are expecting that this plastic will be used in war airplanes as fast as we can turn it out as an enduring and satisfactory replacement for aluminum and other metals. We are gratified to know that Consolidated will thus become in 1943 the producer of a material very vitally important in the direct war effort."

More than 30 persons are now employed on plastics and the force will be expanded as rapidly as the new plant gets into operation. W. J. Sanderson, formerly of the Fleet Aircraft, Ltd., of London and Fort Erie, Canada, is manager of the department and his assistant is Delbert G. Rowland of the Consolidated organization. A. B. Silcox, Fort Erie, Ont., is Canadian technical field representative, and E. A. Searing, formerly of Wausau, Wis., is U. S. technical field representative. Chief inspector is W. C. McLendon, chemical engineer, formerly of Green Bay, Wis. Lawrence Crunelle, Chicago sculptor, is employed as the designer of plastic products. The company's research work was done under the direction of Gilbert K. Dickerman, technical director.

To Augment Water Power

As a means of augmenting the supply of water power for paper mills along the Wisconsin River, the Wisconsin Valley Improvement Company, Wausau, Wis., has started work on the raising of the earth embankment and concrete structure four feet at its Spirit River dam near Tomahawk, Wis. The Wausau Construction Company, Wausau, Wis., will raise the dam, and Carl and Joseph Theiler, Tomahawk, have the contract for the earth fill, requiring about 27,500 cubic yards. Purchase of 1,500 acres of additional land for the flowage has practically been completed, with an appraisal committee appointed to fix values on disputed tracts. Authority to proceed was given by the Wisconsin Public Service Corporation, public utility which operates power plants in that section.

Noteworthy Example of Timber Farming

The Nekoosa-Edwards Paper Company's industrial forest plantation experiment in Wood County, Wisconsin, is the state's principal and most noteworthy example of timber farming, according to John S. Bordner, head of Wisconsin's land economic inventory department. It has shown "phenomenal results," the survey reported. The company has a mixed plantation of pine near Wisconsin Rapids. Although only eleven years old, the average tree is 4.4 inches in diameter and 25 feet in height. The plantation is producing the equivalent of 1.4 cords of pulpood per acre.

More vigorous and effective public and private effort is being urged in public and private forest planting and plantation management. The annual report of Fred G. Wilson of the Wisconsin cooperative forestry division, shows that county reforestation activities in the state were reduced during 1942 to the

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The 85th year of continuous operation greets the fourth generation of men and women who carry on the tradition of Hamilton Felts. The fathers and grandfathers of many of them labored here, determined to make the best possible felts for the varied requirements of the paper industry. To the challenge of global war they present a united front. As in every war in which our country has been involved, Hamilton Felts will do their duty. » » And as every soldier, sailor, marine and flyer in the fighting forces of the Nation is specially equipped for the kind of duty before him, so every Hamilton Felt is constructed to perform its special function on the paper machine. Tell us what kind of paper you desire to produce and we will provide the Hamilton Felt that will do your work better, faster and at lower cost.

From the thinnest tissue to the heaviest board, there is a Hamilton Felt that will do your work better, faster and at lower cost.

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• Established 1858 •

lowest level in five years. This was caused largely by the scarcity of labor for such purposes and the abandonment of U. S. Civilian Conservation Corps camps.

Twenty-three counties accounted for the planting of 10,625,000 young trees during the last year, Mr. Wilson reports. Marinette County, which has several paper mills, led with 1,800,000 trees planted. Timber sales from county forests have increased, and for the last fiscal year they produced 19,000 cords of pulpwood, in addition to 1,500,000 board feet of saw logs. Counties harvested at the rate of one cord for 87 acres of timber land. Selective cutting is rigidly observed, under supervision of district foresters.

Badger Mills Give Bonus Checks

Bonus checks were distributed by the Badger Paper Mills, Inc., Peshtigo, Wis., last week based on the company's plan of distributing funds in excess of the cost of accidents each year, as a means of promoting the best possible safety record in all departments. These ranged from a high of $8.61 to a low of $6.98 per employee in the mills. The most accidents for the year were equivalent to $9.40 per employee.

The experience of 1942 showed an increase of 25 per cent in the number of accidents over the previous year, while lost time cases remained practically the same. The day losses due to injury increased approximately 60 per cent, amounting to 137 time days. This is the fourth year of such distribution by the company.

Belt Dept. Enrolls 100 Per Cent

Eighty-three women in the belt department of Kimberly-Clark Corporation's Lakeview mill at Neenah, Wis., represent the first of 21 departments to become 100 per cent enrolled in the purchase of war bonds to the extent of at least ten per cent of the payroll. The Lakeview Independent Union has a goal of enrolling all departments.

R. F. Bellack Back From Training

Richard F. Bellack, executive vice-president of the Fox River Paper Corporation, Appleton, Wis., is back at his desk after completing training in the second civilian orientation course given for 86 business and industrial executives by the United States Army at Fort Leavenworth, Kan. The 4-week course was a condensation of the general staff course and service of supply, directed by 64 instructors, with duties patterned after the schedule of the regular soldier from 6:00 A. M. to 11:00 P. M. daily. Objective was to promote understanding and cooperation of industry and business was the army.

Paper Men Granted Patents

A patent has been granted to D. C. Porter, Appleton, Wis., and W. H. Swanson, Menasha, Wis., on a process for making sulphite pulp. Rights have been assigned to the Paper Patents Company, Neenah, Wis.

Engagements and Marriages

Dr. Alan P. Adrian, chemist at the Detroit Sulphite Paper Company, Dearborn, Mich., and Miss Verna La Plante of Milwaukee, were married December 31 at Holy Rosary church at Milwaukee. Dr. Adrian formerly resided at Appleton, Wis., where he received his B.A. degree at Lawrence College, and his Ph.D. degree last June at the Institute of Paper Chemistry. The couple will reside at Dearborn.

Mr. and Mrs. William C. Wing of Neenah, Wis., have announced the engagement of their daughter, Mrs. Bonnie Wing Olmsted to Edwin J. Wenndorf, formerly of Manitowoc, Wis., and now with the conservation division of the War Production Board in Washington, D. C. Mr. Wing was president of the former Fox River Paper Company, Appleton, Wis.

The engagement was announced last week of Arthur B. Kaplan and Miss Jane Elizabeth Frank, both of Appleton, Wis. Mr. Kaplan is a graduate of Syracuse University, Syracuse, N. Y., and is a research assistant and instructor at the Institute of Paper Chemistry at Appleton.

Miss Jean Lewis, daughter of Dr. and Mrs. Harry F. Lewis, Appleton, Wis., became the bride of Capt. Horace A. Parks of the U. S. Marines, December 29, in a ceremony at the chapel of the marine station at New River, N. C. Both are graduates of Ohio Wesleyan University. The bride's father is dean of the Institute of Paper Chemistry.

Clifford T. Perkins Dead

WESTBROOK, Me., January 4, 1943 — Clifford T. Perkins, 47, for several years employed by the S. D. Warren Paper Company in an executive capacity, the past six years as assistant superintendent, died December 24 in his home, 9 Walton street, after a long illness.

Mr. Perkins, born at Oqunquit, son of the late James and Lizzie Thompson Perkins, was graduated from Bowdoin College in 1915 magna cum laude. Entering Bowdoin at the age of 14 years he was the youngest student to be enrolled in that time. He was a member of Phi Beta Kappa. He attended the public school at Wells.

After being graduated from Bowdoin, Mr. Perkins was employed by the Penobscot Chemical Fiber Company. He later became associated with the S. D. Warren Paper Company, where he was employed 24 years, working for several years in the company's Boston office and later serving as manager of the Copsecook Mill at Gardiner.

He was a past president of the Gardiner Rotary Club and a member of Warren Phillips Lodge, F. & A. M.; the Mystic Shrine, Kora Temple, at Lewiston, and was an attendant of the Warren Congregational Church, Westbrook.

He leaves his wife, Mrs. Elsie Pinkham Perkins, and two daughters, the Misses Eloise and Cornelia Perkins, both of Westbrook.

Honored for 50 Years of Service

CLAREMONT, N. H., December 28, 1942—Honors and gifts for 50 years of continuous service were heaped upon the desk of Miss Sarah E. Warren, head accountant of the Claremont Paper Company, one morning recently as the veteran office employee completed a half century of duty with the local firm.

Miss Warren, arriving at 9 o'clock, found her desk decorated and piled with remembrances. These included a gold watch and a bouquet of flowers from the company, a second bouquet from Claremont Local No. 177, a radio from her associates in the office, and letters of congratulation from officials of the company whose employ she entered in December, 1892.

Foreign Enemy Attacks—

Paper mills, like nearly every American industry, wage a continuous battle against mold and decay. In paper making processes, large amounts of water are used—water that carries fungi, algae and slime-forming bacteria. Wood pulp in storage is also vulnerable to stain and decay. These enemies are a threat to both quality and quantity of finished materials.

To help win this fight for better products, manufacturers call upon Dowicide industrial germicides and fungicides.

Small quantities of one or more of the 17 Dowicide products are used in various processing operations to inhibit the growth of fungi and bacteria. They are helping to make better paper, leather, paint, lumber, and many other materials.

THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

New York • St. Louis • Chicago • Houston • San Francisco • Los Angeles • Seattle

OTHER PROTECTIVE SERVICES PROVIDED BY DOWICIDE: Preservation of lap and pulp stock—Dowicide F or G; longer felt life—Dowicide G; preservation of mold resistant paper products—Dowicide A, B and G; prevention of decay and termite attack—Dowicide G; for reducing maintenance costs—Dowicide 7, preserves structural timbers. Write for full details.

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CHEMICALS INDISPENSABLE TO INDUSTRY AND VICTORY

Canada Announces Rationing of Newsprint

Wartime Price and Trade Board Acts in Cooperation With WPB to Adopt Curtailment Schedule to Reduce Use of Newsprint and Paper For Magazines—Tonnage Approximates 1941 Consumption.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., January 4, 1943—Without specifying details, the Wartime Price and Trade Board has announced that rationing of newsprint paper and paper for periodicals goes into effect as from the beginning of this year. As the board has been in constant touch with the War Production Board in Washington, it is assumed that the rationing here will follow the plan announced in the United States whereby publishers have been ordered to cut use of newsprint back to the tonnage used in 1941 to produce their net paid circulation.

Details of Order Now in Effect

The Canadian rationing order, effective tomorrow, carries out plans forecast last October when the first orders limiting production and delivery of newsprint and magazine paper were announced concurrently in Washington and Ottawa, the Prices Board said.

The orders then issued froze production at 100% of the monthly average for the six-month period April to September, 1942, and prohibited manufacturers from delivering paper in quantities to make the purchaser's stock more than 90 days' supply.

"To ensure equitable distribution of paper, the rationing order authorizes a system of permits to be issued by the administrator of publishing, printing and allied industries, John Aitkins, Toronto," the board statement said.

"Without a permit no person may lawfully buy, acquire or use any paper for the publishing of any newspaper or periodical.

"Six factors will be considered by the administrator in fixing each paper's quota: (1) Total available supply of print paper from time to time; (2) Methods of sale and distribution; (3) Use of paper prior to November 1, 1942; (4) Circulation changes prior to November 1, 1942; (5) Minimum requirements and total volume of use, and (6) Potential economies."

The order provides that persons who require print paper during January may purchase, acquire and use it until receipt of a permit; but the quantities must be reported to the administrator and will be deducted from the permitted quota. Newspapers and periodicals and the printers of them come under the rationing regulations.

A section of the order provides that no person may print any newspaper or other periodical for any other person except on the written order of the holder of a paper-purchase permit. The order applies to all grades and qualities of paper used in the production of the finished product.

Commenting on the order, the Montreal Gazette says: "Details are still lacking as to the rationing of newsprint announced by Ottawa on New Year's Eve, but the Government knows it may proceed with confidence in the full co-operation of Canadian newspapers and periodicals. The publishing industry has known since October, when newsprint production was 'frozen,' that rationing lay ahead, and publishers have given the authorities advice and collaboration in devising an equitable system.

"Rationing is made necessary in this field not by any shortage of newsprint itself. There are still ample supplies of pulpwood and plant capacity to produce all the newsprint we could use. The shortage is of hydro-electric power, of which newsprint manufacturing is a tremendous consumer, and to a lesser extent of manpower. These facts should perhaps be made clearer to Canadians, especially those, many of them in this province, whose livelihood is bound up with the newsprint industry, so that they may be fully convinced of the real necessity for this step.

"Newspaper publishers are already so convinced, as they have told the Government. This happens to be a form of consumer rationing which hits our industry peculiarly, but it is none the less welcome. Like other Canadians, publishers are ready for any sacrifice that help to win the war."

Situation Better in Woods Operations

The situation as regards labor supply in lumber and pulpwood cutting plants is reported to have become somewhat brighter. Sometime ago Newsprint Controller Weldon predicted a shortage of 5,000,000 cords in pulpwood supplies in North America for 1943, indicating a 23 per cent drop in paper production in Canada and the United States. The Montreat Financial Times reports that within the trade this estimate is now being viewed as excessive. It is being pointed out that pulp mills have approximately six months' supply of pulpwood in woodpiles, and that waste paper probably will be used to greater extent in making some grades of paper and paperboard. It continues:

"In addition, government statements indicate that the manpower situation in the lumber camps is improving, and may be improved further, which would indicate that production of pulpwood this next year will be larger than earlier feared.

"In some quarters, estimates are now being voiced that reduction in paper use this next year may not be greater than 10%. There may be relatively larger reduction in output of newsprint than in some other grades of paper, but the situation is not yet clear.

"It is evident, however, that pulpwood supply will be a constant problem throughout the coming year, with many uncertainties due to recurring demands for labor for special types of work, which might, with enlistments in the armed services, drain labor from lumber camp work.

"Meanwhile, the price situation continues obscure, with contention of the operators for higher prices to compensate for increased costs bolstered by threat of curtailed paper production this next year and corresponding adverse effect on manufacturers' profits. There there will be some price adjustments seems assured, but amount of such price changes depends on

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government approval, from Washington as well as Ottawa."

Compensation Plan for Newsprint Manufacturers

The plan which has been announced for the rationing of newsprint provides for a distribution of orders for newsprint among mills most strategically situated for the production of newsprint, having regard to economy in production and the conservation of manpower and hydro-electric energy. This has made necessary a compensation plan for mills adversely affected. The Prices Board, in assigning to each of Canada's 25 newsprint manufacturers an established percentage of total production, has ordered the setting up of a stabilization fund from which compensation is to be paid. The percentage of total production will remain constant unless and until changed by R. L. Weldon, administrator of newsprint, the percentage being a fixed percentage of the total amount of newsprint invoiced by all manufacturers in any month. The Board's statement continued that the established percentages of the various manufacturers were determined by the administration after many consultations with members of the industry's advisory committee.

Here is how the compensation plan will work:

When in any calendar month a manufacturer invoices to his customers and to other manufacturers a quantity of newsprint manufactured by him to excess of his established percentage, he will be required to remit a proportionate sum to a fund established by the Prices Stability Corporation for the purposes of the order. When in any month a manufacturer invoices newsprint in an amount short of his percentage, he is to receive from the fund a corresponding sum. Cost of operating the compensation plan is to be borne by the stabilization fund.

Amounts which manufacturers are to remit or receive in consequence of allocation and other controls exercised since September 1 last are to be fixed by the administrator on or before January 20. Remittances to the fund and payments to other manufacturers are to be made on or before January 25 and payments out of the fund by February 1.

The announcement said that in the case of "transferred tonnage"—newsprint tonnage which the administrator orders transferred by one manufacturer to another for production—the manufacturer who produces and ships it is to invoice it at full price to the transferring mill, which is to pay on or before the 25th of the month following invoice date.

Each manufacturer who produces and ships transferred tonnage is required when directed by the administrator to pay into or receive from the fund whatever amount is necessary to adjust the basic mill net price of the tonnage to the basic mill net price of the manufacturer's own tonnage of newsprint.

The order defines "basic mill net price" as that received from each manufacturer from his customer after deducting (1) all transportation and delivery charges paid by the manufacturer; (2) all storage and incidental charges paid by the manufacturer, in the case of water shipments, and (3) all up-charges or extra charges made by the manufacturer for newsprint other than standard white newsprint in rolls, as customarily wrapped for shipment to customers in Canada and the United States.

Contributions to the fund on account of tonnage in excess of established percentage are determined by a complicated formula. It is set forth in the order as follows:

"Such sum shall be the product of the average price per ton charged by the manufacturer for the newsprint paper invoiced to his own customers in such month multiplied by the number of tons of such excess tonnage, less an amount equal to the difference between such manufacturer's total costs of operation during such month and such manufacturer's total estimated costs of operation at the level of his established percentage including in both instances full allowances for depreciation and fixed charges." The amount to be received from the fund by manufacturers falling below their established percentage is similarly computed.

In determining the amounts to be paid or received, however, the administrator is authorized to consider gains or losses arising from the manufacture on newsprint machines of products other than newsprint paper with respect to the relative profits of such other products compared to newsprint and also any reduction in costs occasioned by operation at a rate below the established percentage.

It is provided that no manufacturer shall be entitled to receive or participate in any compensation for tonnage in excess of his recognized capacity to produce newsprint, based upon his previous performance as determined by the administrator.

If at any time payments into the fund exceed disbursements by an amount unnecessarily large, the administrator may order payments to the manufacturers on the basis of their established percentages. If, on the other hand, payments prove insufficient for requirements, the administrator may order payments to the fund by manufacturers on the same basis.

TAPPI Packaging Committee Meets

The Packaging Committee of the Technical Association of the Pulp and Paper Industry held a meeting at the office of the association in New York on January 4.

It was generally agreed by the committee that the wide utility of paper in varied forms in wartime could best be presented by exhibiting the packages now in use. The exhibit will be held in connection with the annual convention of TAPPI at the Commodore Hotel, New York, February 15-18.

The exhibit will be open to the public and although similar to the exhibit in Boston will be much more comprehensive. It will include the application of paper in the war effort and also show how paper is being applied extensively to take the place of critical and scarce materials, no longer available for general civilian use.

Hermann Co. at Capacity for Defense

The capacity of The Hermann Manufacturing Company is being used for defense production on a seven day week schedule.

They have thirteen employees in the armed forces, one of them being John R. Hermann, who is in Australia in the Signal Corps. He is the younger son of W. H. Hermann, president.

Hermann employees are proud of the 10% Minute Man Flag, signifying over 10% deduction of their wages for War Bonds.

Canada Reconciled to Curtailment of Paper

Higher Newsprint Price Still Hoped For This Year—Fine Paper Production is Expected to Decline Further in 1943—Situation of Chemical Pulp Manufacturers Is Considered More Favorable.

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., January 4, 1943—Canadian paper trade interests face the rationing of newsprint paper with confidence that essential supplies will be available throughout the year and reconciled to the inevitable reduction in manufacturing operations and curtailed use of paper.

During 1943 the industry must adjust its operations to conform to manpower, wood supply, power and shipping conditions. These factors, along with rising taxation, all spell lowered profits for the manufacturers of paper, particularly newsprint. There is still a feeling of hopefulness regarding the price situation. A spokesman for the War Production Board in the United States is reported here to have informed American publishers to expect a price increase this year for newsprint. Even so, according to a leading financial sheet, an advance of $5 or $10 a ton, would still leave the manufacturers in a position of being able to keep earnings on a basis permitting only payment of fixed charges with sufficient balance left over to maintain property.

Fine Paper Output Expected to Decline

The outlook for the manufacturer of fine papers is not very much better; both operations and earnings are expected to show a further decline during this year. The great buying spree of a year ago turned out to be just that, instead of a real improvement in demand. Stocks were being accumulated. As the situation became apparent, demand fell off and half way through the year there was no difficulty in keeping up with orders. The same set of conditions affecting the newsprint division apply with equal force to fine papers. Restrictions cut production below the previous year and the trend of production during the next 12 months is expected to be downward from the "ceiling," as pulpwood and manpower supplies become more difficult.

Pulp Manufacturers' Situation More Favorable

Conditions surrounding the chemical pulp division are more favorable. Ordinarily, sulphite pulps go into the manufacture of high grade papers, rayon, etc, Since the beginning of the war, more and more of the higher grades have been used for the manufacture of nitrocellulose. Pulp has taken the place of cotton in several Canadian plants. Demand for the high grade sulphite pulps continues unabated and is likely to so continue for the duration, providing manpower and supplies are available.

Sulphate pulps, employed in making kraft papers, have also been enjoying unprecedented demand because of the need of wrappings for munitions. Prospects for the kraft division continue favorable and while some falling off in production may occur before the end of the year, indications are that the output will hold at a high level.

Insulating board, also in heavy demand during the last couple of years, for semi-permanent shelters for the armed forces at home and abroad and for temporary housing in Great Britain, has as yet experienced no indications of a decline in that demand for some time forward. Yet, with major building projects completed, the need for board, it is expected, may drop off before the year ends.

Total Pulp Production To Be Lower

Taking the pulp and paper industry as a whole, the output of all classes of pulp and paper on a tonnage basis undoubtedly will be lower in 1943 than was the case in 1942. However, the output during the last few years has been well above the average. An enforced curtailment in production due to manpower, electrical energy, shipping and pulp wood supplies, would still leave production above pre-war levels. From the standpoint of tonnage, the 1943 prospects range from fair to excellent, with the exceptions noted.

With the anticipated decline in the production of newsprint, fine papers, etc., overhead costs per unit must inevitably rise, thus affecting earning power of the operators in those fields. Without a rise in the price of newsprint, especially on shipments to the American market, the outlook for the maintenance of earnings by the newsprint companies is not overly encouraging.

Earnings of the fine paper makers are likely to undergo a shrinkage this year, due, not only to a drop in production, but also to higher taxes. Higher taxes are generally expected for all concerns.

Operators engaged in the manufacture of high grade sulphite pulp or sulphate pulp and kraft papers, as well as those engaged in the paper board fields, should continue to do very well, though it is doubtful if any gains can be made in production, while costs continue to ascend.

In short, Canada's pulp and paper industry faces a vastly different year in 1943 to that prevailing at this time a year ago. At that time the industry looked forward to the prospect of operating to near capacity, with the prospect of better prices. Now the industry faces many problems which were not foreseen a year ago. Shipping difficulties have increased, manpower has become scarce, costs have risen, a power shortage has developed in several areas, wood supplies are low and uncertain, the production of paper products has been frozen at a fixed level, and from now on paper is to be rationed. All this paints a picture of definitely lower production of pulp and paper in Canada during the next 12 months.

Newsprint production in 1942 ran around 3 million tons, a drop of 325,000 tons from 1941. No official returns are available on chemical pulp output for the year, but indications are that production was up to the 1941 level or perhaps a little

greater. Fine paper production held up though the demand indicated at the opening of the year was not realized.

The pulp and paper industry has not been classed as essential, but the chemical pulps and board divisions are so closely related to the war effort it is not at all likely that their operations will be interfered with by selective service agencies, and will therefore be in a good position to maintain maximum production during the year.

Pulpwood Drop of 25% Expected

No figures are available as yet concerning the decline in pulpwood production, but a drop of at least 25% is expected. The information will not be available for another month or so.

There is no immediate relief in prospect for shipping. Shipments of pulp and paper products, particularly newsprint, have been very irregular and greatly curtailed over the past year. The same situation applies to coastwise shipping between Canada and the United States. Coastwise shipping, in fact, has dwindled to very small proportions.

There is some satisfaction felt in the newest regulations rationing paper, inasmuch as the curtailment in paper use is not expected to exceed 10%, whereas a cut of 24% had been talked about and would not have surprised the industry at large. Many were figuring that newsprint manufacturers would not be operating at more than 55% of capacity, if and when the predicted regulations were announced.

Harry Fletcher to Receive TAPPI Medal

Since 1928 the Technical Association of the Pulp and Paper Industry has awarded ten gold medals to individuals who have made outstanding contributions to the technical advancement of the industry. These awards have been made to William H. Mason, Ogden Minton, Ernst Mahler, Edwin Sutermeister, William H. Millspaugh, Clarence J. West, Carl B. Thorne, J. Newell Stephenson, Otto Kress and Robert B. Wolf.

The 1942 medal has been awarded by the executive committee to Harry Fletcher, president of the Fletcher Paper Company, Alpena, Mich.

Mr. Fletcher graduated in chemical engineering, majoring in cellulose chemistry from the University of Michigan in 1907. On leaving college he went to work for the Fletcher Paper Company, of which he is now president. In 1912 he wrote an article for the magazine *Paper* on Obtaining Costs in a Paper Mill. This article was reprinted in 1933 in the Paper Trade Journal during the National Recovery Administration. It was probably the first suggestion of this type of accounting.

He was identified with the development of high density bleaching, his name being applied to the so-called Fletcher Type Bleacher. In 1914 he approached the Sulphite Wrapping Paper Division of the American Paper and Pulp Association with the idea of organizing the technical men of the industry. This plan was approved by President Hastings and his Executive Board and preliminary surveys and meetings were held. This led to the organization of the Technical Association of the Pulp and Paper Industry whose work has contributed enormously to the improvement of manufacturing operations and controls in the industry. So complete and accurate has been the standards development work of the Association that before and during the war period the official testing methods of TAPPI have been written into a large number of the paper specifications used by the armed services. TAPPI's contribution to the literature of the industry has been very great and includes the textbooks on the Manufacture of Pulp and Paper, Technical Association Papers, Bibliography and U. S. Patent Annuals, Special Reports on Manufacturing Problems, TAPPI Standards, Engineering Data Sheets, the TAPPI Bulletin and TAPPI monographs on Water and Fourdrinier Wires.

Mr. Fletcher has held such positions as president of the Crittal Casement Window Company, makers of the first high class casement windows in America;

Harry Fletcher

vice president, Alpena Power Company; president, Gilchrist-Fordney Lumber Company; president, Gilchrist & Co., Ltd.; president, Gilchrist Timber Company; president of Bob-Lo Excursion Company; member of the Michigan Board of Aeronautics; member Isle Royal National Park Commission, and he has been a director of the Alpena Savings Bank, Rust Land and Lumber Company, 3 States Lumber Company and the Rust-Owens Lumber Company. During the World War I he was a member of the Michigan War Board, Staff Assistant, Emergency Fleet Corporation and Chief of Division of the American Protective League.

St. Regis Mill at Norfolk Resumes

Norfolk, N. Y., December 31, 1942—Full time operations were resumed at the local branch of the St. Regis Paper Company last week after a shutdown of several days because of a fire originating in the coal conveyor system. The village fire department was called out and had the fire under control within a short time. An official of the concern announced that repairs had been made to the damaged portion and all papermaking machines were running again. The mill is now employing about 500 men and has large government contracts as well as other orders. Apparently the fire started from spontaneous combustion in the conveyor system which carries fuel from the storage shed to the furnaces. The mill was threatened by the fire but quick action by the firemen kept the flames from reaching it and the repairing of all damage is expected to be completed this week.

THE *Dynamic* WAY OF LIFE

Not for generations have Americans been so acutely aware of the meaning of freedom. No longer do we take it for granted. To us it is now the sword and the shield, the spade that turns the soil, the spark that powers our industries, the master key to scientific progress. Without it the dynamic way of life we call Democracy could not be possible. For Democracy thrives only in the air of freedom.

Symbolic of the stream of freedom in American history, and of the dynamic way of life this country has followed, is Niagara. From it millions of Americans have derived a vision of strength, abundance and power. They have seen in Niagara the great potentialities that the hills and plains and rivers of this country offer, and the ideal of humanity flowing towards a new goal. They see strength and permanence, too, in ceaseless forward movement. In the light of events today, Niagara is now more than ever a true expression of America.

We who work within sight and sound of Niagara Falls are devoting every ounce of our energies and facilities to speeding the flow of chemicals for Victory.

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WPB CUTS NEWSPRINT USE TO 1941 LEVEL

(Continued from page 7)

used in the printing of a newspaper, or used in the printing of material physically incorporated into a newspaper.

"Net paid circulation" means the sales of a publisher's newspaper audited, or otherwise verified, in accordance with the standards of the Audit Bureau of Circulation.

"Base period" means the year 1941.

(2) No publisher, or any person for his account, is allowed to buy, acquire, or in any manner accept delivery of print paper except for the printing of the publisher's newspaper.

(3) No publisher is allowed to use or cause to be used for his account, print paper for the printing of any newspaper during any calendar quarter in excess of 100% of the amount of print paper used by him, or for his account, in the printing of the net paid circulation of his newspaper during the corresponding calendar quarter of the base period.

(4) In order to compensate for the print paper lost to a publisher in wrappers covering paper delivered to him by his supplier, and that lost to him through damage in transit and in printing spoilage, he may add to the total quarterly amount of print paper authorized three per cent of the total amount of print paper used by him in the printing of the net paid circulation of his newspaper during the corresponding calendar quarter of the base period.

Exemptions to Restrictive Order

(5) The following are exempt from the order:

Any publisher who shall use on and after January 1, 1943, 25 tons or less of print paper during any calendar quarter. To this quota may be added any print paper used by the publisher to produce copies of his newspaper furnished to the Armed Services of the United States.

Any newspaper of eight pages or less authorized to be admitted to the mails as second class matter under the provisions of Section 521 of the Postal Laws and Regulations of 1940, pertaining to the publication of benevolent, fraternal, trades-union, professional, literary, historical, and scientific organizations or societies.

(6) Any loan of print paper made by a publisher must be reported by him in a letter sent in triplicate to WPB within 30 days of the loan.

Issuance of the order came only after long study of the problem in all its ramifications by government agencies and leaders of the industry.

Explains Drastic Curtailment Order

In addition to the primary causes for curtailment of supply, other factors were the expanding smokeless powder program; the demands of the important chemical industries; the increasing need for paper containers growing directly out of the war effort; the loss of burlap, formerly imported from India, and manila from the Philippines, and the limitation on the use of steel drums.

These shortages have put a tremendous burden on the supplies of heavy duty paper bags for war shipment and essential civilian use. Production of Multiwall paper sacks, for example, is expected to jump from 300,000 tons in 1942 to 600,000 tons in 1943.

Production of photographic paper for the Army is being stepped up heavily. Such demands have to be met.

The government has made heavy commitments of pulp in its lend-lease program to England and Australia, and sizable tonnages will go to South America under the Board of Economic Warfare's program.

The net Result is that with a decline in the supply and new war uses impinging, along with the expansion of certain essential civilian uses, the remaining uses must be cut.

Print paper, the Division emphasized, is regarded as essential, but the pulpwood shortage now developing has made necessary a curtailment in the size of newspapers, magazines and in the use of paper in almost every other type of civilian use.

With careful planning, however, the curtailment can be effected without disruption of the industry. The object of the order is to keep a balance between the total supply and the essential requirements for paper.

Working together on the paper problem for many months have been committees from the wood pulp industry, as well as Government representatives from the Printing and Publishing, Pulp and Paper, and Containers Divisions, Lend-Lease officials, Army and Navy officers, the Board of Economic Warfare, and the Division of Civilian Supply, and Labor Production Division of WPB.

They came to the conclusion that the supply of pulpwood available for consumption in the United States and Canada in 1943 would be 25% less than that used in 1942; but that by drawing on the inventory on hand at the close of the year that figure might be reduced to 20%.

TITLE 32—NATIONAL DEFENSE
CHAPTER IX—WAR PRODUCTION BOARD
SUBCHAPTER B—DIRECTOR GENERAL FOR OPERATIONS
PART 3133—PRINTING AND PUBLISHING
GENERAL LIMITATION ORDER L-240

The fulfillment of requirements for the defense of the United States has created a shortage of the supply of print paper for defense, for private account and for export; and the following order is deemed necessary and appropriate in the public interest and to promote the national defense:

Definitions of Limitation Order L-240

Section 3133.6—General Limitation Order L-240.

(a) Definitions. For the purposes of this order:

(1) "Person" means any individual, partnership, association, business, trust, corporation, governmental corporation or agency or any organized group of persons, whether incorporated or not.

(2) "Newspaper" shall include any publication usually recognized as a newspaper in the newspaper industry regardless of the frequency of issuance.

(3) "Printing" means the act or process of printing, impressing or otherwise transferring onto print paper any ink, color, pigment, mark, character or delineation.

(4) "Publisher" shall include, but by way of limitation, any person issuing a newspaper.

(5) "Print paper" means any grade or quality of paper used in the printing of a newspaper, or used in the printing of material physically incorporated into a newspaper.
(6) "Net paid circulation" means the sales of a publisher's newspaper or newspapers audited, or otherwise verified, in accordance with the standards of the Audit Bureau of Circulations of January 1, 1942.
(7) "Base period" means the year of 1941.
(8) "Director" means the Director General of Operations.

Restrictions In Effect January 1, 1943

(b) General Restrictions. On and after January 1, 1943:
(1) No publisher, or any person for his account, shall purchase, acquire or in any manner accept delivery of print paper except for the printing of the publisher's newspaper or newspapers.
(2) No publisher shall use, or cause to be used for his account, print paper for the printing of any newspaper or newspapers during any calendar quarter in excess of 100% of the amount of print paper used by him, or for his account, in the printing of the net paid circulation of his said newspaper or newspapers during the corresponding calendar quarter of the base period.
(3) To compensate for the amount of print paper lost to a publisher in the publication of his newspaper or newspapers in the form of wrappers covering print paper delivered to him by his supplier, and that lost to him through damage in transit and in printing spoilage, the publisher may add to the total quarterly amount of print paper authorized by subparagraphs (1) and (2) of this paragraph, 3% of the total amount of print paper used by him in the printing of the net paid circulation of his said newspaper or newspapers during the corresponding calendar quarter of the base period.
(c) Exceptions. The provisions of paragraph (b) (1) and (2) hereof, are inapplicable to:
(1) Any publisher who shall use on and after January 1, 1943, 25 tons or less of print paper in any calendar quarter for the printing of any of his newspaper or newspapers. Any such publisher is authorized, in addition, to deduct from the tonnage of print paper used by him in any calendar quarter after January 1, 1943, the amount of print paper represented by copies of his newspaper or newspapers which he shall furnish to the Armed Services of the United States.
(2) Any newspaper of eight pages or less authorized to be admitted to the mails as second class matter under the provisions of Section 521 of the Postal Laws and Regulations of 1940 (Title 39 U. S. C. Sec. 229), pertaining to the publications of benevolent, fraternal, trades-unions, professional, literary, historical, and scientific organizations or societies.
(d) Loans of Print Paper. Any load of print paper made by a publisher shall be reported by addressing a letter in triplicate to the War Production Board on or before the 30th day following the date of said loan.
(e) Miscellaneous Provisions.
(1) Applicability of Priorities Regulations. This order and all transactions affected thereby are subject to all applicable provisions of the Priorities Regulations of the War Production Board, as amended from time to time.
(2) Reports. All persons affected by this order shall execute and file with the War Production Board such reports and questionnaires as the Director shall from time to time require.
(3) Records. All persons affected by this order shall keep and preserve for not less than two years accurate and complete records of their inventory, use and sales of print paper, subject to the inspection of the duly authorized representative of the War Production Board.
(4) Appeals. All appeal from the provisions of this order shall be made by filing a letter in triplicate, referring to the particular provision appealed from, and stating fully the grounds of the appeal.
(5) Communications to the War Production Board. All reports required to be filed hereunder and all communications concerning this order shall, unless otherwise directed, be addressed to:
"War Production Board
Printing and Publishing Division
Washington, D. C. Ref: L-240"
(f) Violations. Any person who wilfully violates any provision of this order, or who, in connection with this order, wilfully conceals a material fact or furnishes false information to any department or agency of the United States is guilty of a crime, and upon conviction may be punished for fine or imprisonment. In addition, any such person may be prohibited from making or obtaining further deliveries of, or from processing or using, material under priority control and may be deprived of priorities assistance.

Hundreds Enter Nypen Contest

Hundreds of entries in the Nypen Patriotic Slogan Contest, representing nation-wide distribution of over 22,000,000 printed pieces, testify to the important contribution that printing and lithography are making to the national war effort. Entries have been received, according to the New York & Pennsylvania Company, sponsors of the contest, from practically every large printing center in the entire country and from patriotic printers and lithographers in practically every bracket of production.

"Entries in the Nypen Contest make an interesting and significant cross-section of the work being done by the graphic arts to maintain war-time morale and to spur on war production," says President Eustis Paine of the New York & Pennsylvania Company. "There is no doubt, after seeing this collection of war-time printing, that the graphic arts has a war job to do and is doing it."

Final entries in the Contest were presented to the Board of Awards just before Christmas. The Board will make its announcement of prize winners during January and war bond prizes totalling $1,000 will be distributed.

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COMPLETE DE-INKING PLANT AND PAPER MILL

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PLANT CONTAINS:—

Three cylinder Paper Machine . . . twenty six Dryers 68″ by 48″ diameter . . . Calender Stack . . . Rewinder . . . Cutter . . . Pulp Baler . . . Two one ton Midwest Beaters . . . One 3 ton Shartle Pulper . . . One Six Cylinder Duster . . . Dilts Classifiner and Riffler . . . One Jordan . . . Vortraps . . . Two Bird Screens, ample Chests . . . Pumps, all installed ready for operation . . . De-Inking Unit contains one Cooker, capacity three ton per batch . . . Two specially designed Washers erected, one cooker included, not erected . . . Pumps, Motors completely installed, ready for immediate production . . . also two 150 H. P. Boilers, stoker feed machine shop and complete testing equipment.

This Pulp and Paper Mill was operated for a short time only,—all equipment in excellent condition.

If interested in purchasing this Plant please communicate with

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Telephone Randolph 3871

CONSTRUCTION NEWS

Under limitations order L-41 all projects involving expenditures of more than $5,000 must be specifically approved by the War Productions Board. The status of projects reported herewith under the provisions of the order is not known.—EDITOR.

Wisconsin Rapids, Wis.—The Consolidated Water Power and Paper Company, manufacturer of coated and other paper stocks, book papers, etc., has approved plans for new addition to local mill at 800 Fremont street. It will be used as a press building. Construction will be carried out by company forces, under direction of George Marcoux, superintendent of construction for the company. A priority rating has been secured and work will proceed at once. Thomas Utegaard is company engineer, in charge.

Lima, Ohio—Fire recently damaged a portion of building of Frederick Paper and Twine Company, commercial paper products, with loss reported over $75,000, including equipment, stock, etc. It is planned to rebuild at early date.

New York, N. Y.—The Unique Items Company, 270 Lafayette street, manufacturer of paper specialties, has leased space in building at 100 Fifth avenue, and will occupy for its paper-converting plant, expanding present capacity.

Green Bay, Wis.—The Green Bay Box Company, 1406 South Broadway, manufacturer of paper boxes and containers, is arranging for immediate erection of addition to plant, previously referred to in these columns, to be used for general expansion in production department. The Selmer Company, Northern Building, Green Bay, has the general erection contract. Harry W. Williams, last noted address, is architect.

South Attleboro, Mass.—The Rhode Island Cardboard Company, manufacturer of paper board stocks, has tentative plans under consideration for rebuilding of large local storage plant, recently destroyed by fire with loss reported over $150,000, including buildings, stock, etc.

Glenville, Conn.—The American Felt Company, Glenville, manufacturer of felt products, has awarded general contract to the Mertz Company, 145 Horton avenue, Port Chester, N. Y., for one-story addition to storage and distribution building on Pemberwick road, Greenwich, Conn. It is proposed to carry out work at once. No estimate of cost announced.

Cleveland, Ohio—The Great Lakes Paper Box Company, 7275 Wentworth avenue, manufacturer of folding paper cartons and other paper containers, is having plans prepared by George S. Rider Company, Terminal Tower Building, Cleveland, architect and engineer, for rebuilding of four-story plant, recently destroyed by fire, with loss reported at close to $100,000, as previously reported in these columns. It is proposed to carry out work at early date. An award for emergency work in clearing property preparatory to reconstruction has been made to the Dunbar Company, 8201 Cedar street, Cleveland.

New York, N. Y.—The Stationers' Loose Leaf Company, 237 Lafayette street, manufacturer of paper goods, has leased a floor in building at 114 East Thirteenth street, and will occupy for converting plant. It is understood that company will expand facilities at new location.

New Orleans, La.—The Celotex Corporation, 919 North Michigan avenue, Chicago, Ill., manufacturer of wall board, insulating board, etc., with mill at Marrero, near New Orleans, is acquiring a further interest in the South Coast Corporation, Carondelet Building, New Orleans, manufacturer of cane sugar, and from which it secures the majority of its raw material, bagasse, requirements. During the past year, the Celotex company purchased 18,400 shares of stock of the company noted, and is now closing negotiations for the acquisition of about 93,100 additional shares of common stock.

To Feature Container Exhibit

The Technical Association of the Pulp and Paper Industry will hold a four-day convention at the Commodore Hotel, New York, N. Y., February 15-18, 1943. More than 1000 managers, operating men, and technologists in the paper and container industries will attend to discuss wartime technical problems. Featured in the discussions will be the progress being made toward relieving the critical materials shortages by the development of new packaging materials and containers.

These developments will be dramatized by an exhibit of hundreds of these new products made from paper and paperboard. The exhibit will be open to the public, and all companies that have developed new packages during the past year are urged to display them at this exhibit. There will be no charge for the use of space, because the exhibit will be educational to inform the public of the progress being made and packagers in regard to design characterists. The magnitude and importance to the war effort of the job to be done is so great that no company should hesitate to cooperate.

Companies willing to display the packages and containers that have been developed for their own use or for others should write to R. G. Macdonald, secretary, Technical Association of the Pulp and Paper Industry, 122 East 42nd street, New York, N. Y., for details. All exhibits should be delivered in New York City by January 30, 1943. With the exhibit should be a descriptive statement, preferably on a white card, 6 by 9 inches. The name of the exhibitor should be placed at the bottom of the card.

A New Book on Printing Inks

The Price of Printing Inks, their Chemistry and Technology, by Carleton Ellis, is $7 a copy and not $4 as incorrectly stated in the notice of the book, which appeared on page 23 of the PAPER TRADE JOURNAL for December 24, 1942.

Rules for Transportation Tax

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., January 6, 1943—OPA has laid down rules for manufacturers in the pulp and paper and paperboard industries to follow as to how the 3 percent property transportation tax, effective December 1, is to be handled.

In issuing Supplementary Order No. 31 in November, OPA laid down the rule that this tax must be considered as a freight rate increase rather than as a tax for which a charge may be made in addition to the maximum price of the product being sold. As such it has to be absorbed by the seller on a "delivered price" basis and by the buyer on an "f.o.b." producers' establishment basis. There were some specific exceptions to this general rule.

Pulp, paper and paperboard manufacturers should be guided by these rules:

1. Standard Newsprint is exempted from the Supplementary Order and manufacturers of this product may pass on this transportation tax to the purchaser.

2. Manufacturers of the grades of woodpulp listed and defined in Maximum Price Regulation No. 114, must absorb the 3 percent tax until the amount of the freight bill including the tax is greater than the appropriate freight allowance. When, however, the freight involved including the tax exceeds the appropriate freight allowance, the excess over this amount may be passed on to the customer. Manufacturers of special grades of woodpulp who are in doubt as to how the tax should be handled should communicate with the OPA at Washington, D. C.

3. Manufacturers of paper and paper products including paperboard whose maximum prices are established by Price Regulations other than the General Maximum Price Regulations and who are required to absorb specific dollar amounts of freight thereunder must as in the case of woodpulp continue to absorb the specific allowance including the tax as part of the freight but may pass on any excess to the customer.

4. Manufacturers of paper and paper products, for which maximum prices are established by the General Maximum Price Regulation, in all cases where they have customarily allowed freight must continue to absorb the same proportion of the total freight involved, of which the tax must be considered a part. This rule applies whether the manufacturer customarily allowed full freight as specific dollar amount, carload rate of freight, or any proportion of the actual freight whatsoever.

To End Pollution in Androscoggin

[FROM OUR REGULAR CORRESPONDENT]

AUGUSTA, Me., December 29, 1942—State Attorney-General Frank I. Cowan said today that "eventual abatement" of pollution of the Androscoggin River would "come through a change in the method of operations" of the Brown Company, Berlin, N. H., whose large paper-manufacturing plant is beside the river.

His assertion was made before Governor Sewall and the Executive Council, which authorized transfer of $3200 from the State contingent fund to the attorney-general's department account to meet added expense in connection with efforts to eliminate the pollution.

WAR OR NO WAR
E
NAVY
AWARDED BAUER BROS. SEPT. 4, 1942
FOR VICTORY BUY UNITED STATES WAR SAVINGS BONDS AND STAMPS
THE BAUER BROS. CO.

Every pulp and paper mill should understand that the BAUER DOUBLE DISC PULPER will convert various rejects and screenings into valuable and saleable products.

Economical recovery of waste materials is important — ANYTIME —

Write or Wire

The BAUER BROS. CO.
SPRINGFIELD, OHIO

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending January 2, 1943

STOCKS

	High	Low	Last
A. P. W.	1⅜	1⅜	1⅜
Armstrong Cork Co.	33⅜	30	30
Celotex Corp.	8½	7¾	8¼
Celotex Corp., pf.	76¾	74	76¾
Certain-Teed Products Corp.	3	2¾	3
Certain-Teed Products Corp., pf.	33¾	31½	33¾
Champion Paper & Fibre Co.	18⅜	17	17¾
Champion Paper & Fibre Co., pf.	100	100	100
Congoleum Nairn Co.	18⅜	17⅜	18⅜
Container Corp. of America	16½	16¼	16¼
Continental-Diamond Fibre Co.	7⅜	6⅜	7⅜
Crown-Zellerbach Co.	11⅜	10⅜	11⅜
Crown-Zellerbach Co., pf.	81½	78½	81½
Dixie-Vortex Co.	10	9½	10
Dixie-Vortex Co.—A	39	37½	39
Flintkote Co.	16½	15⅜	15⅞
Robert Gair	1⅜	1¾	1⅜
Robert Gair, pf.	9	8¾	9
International Paper Co.	8¼	7¾	8¼
International Paper Co., pf.	46¼	44	45⅞
Johns-Manville Corp.	72¾	70⅜	71½
Johns-Manville Corp., pf.	....	....	....
Kimberly Clark Corp.	25¾	25	25
MacAndrews & Forbes	20	18½	20
MacAndrews & Forbes, pf.	123	122	123
Masonite Corp.	34	33	33¾
Mead Corp.	6¼	6	6
Mead Corp., pf.	58	58	58
Paraffine Companies, Inc.	37¼	36½	36¾
Paraffine Companies, Inc., pf.	....	....	....
Rayonier, Inc.	12½	10	12½
Rayonier, Inc., pf.	26½	26½	26½
Ruberoid Co.	20⅞	20¾	20½
Scott Paper Co.	39	37	38¼
Scott Paper Co., pf.	110	110	110
Sutherland Paper Co.	26⅜	26	26¼
Union Bag & Paper Corp.	8	7⅜	8
United Paperboard Co.	3⅜	3	3¼
U. S. Gypsum Co.	63¾	60½	62
U. S. Gypsum Co., pf.	174¾	174¾	174¾
West Virginia Pulp & Paper Co.	12	11¼	12

BONDS

Abitibi Pulp & Paper Co. 5s '53	....	....	....
Celotex Corp. 4½s '47	98	97	97
Certain-Teed Products Corp. 5½s '48	94½	92⅜	92⅜
Champion Paper & Fibre Co. 4¾s '50	....	....	....
International Paper Co. 6s '55	105½	105	105½
International Paper Co. 5s '47	103	102¾	102¾
Mead Corp. 4½s '55	....	....	....
West Virginia Pulp & Paper Co. 3s '54	....	....	....

New York Curb Exchange

High, Low and Last for Week Ending January 2, 1943

STOCKS

	High	Low	Last
American Box Board Co.	4⅛	4	4⅛
Brown Co., pf.	....	....	....
Great Northern Paper Co.	27	25⅜	26¾
Hummel-Ross Fibre Corp.	3	2¾	3
National Container Corp.	8¾	8¼	8¾
St. Regis Paper Co.	1¾	1⅜	1⅜
St. Regis Paper Co., pf.	115½	113	115½
Taggart Corp.	3¾	3⅛	3¾

BONDS

American Writing Paper Co. 6s '61	90	90	90

Dryden Co. Earns $1.07

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., January 4, 1943—The annual statement of the Dryden Paper Company, Limited, for the 12 months ended September 30, 1942, shows gross profits, after adding miscellaneous income, at $683,258 for the past year, an increase of over $255,000 as compared with preceding year. After deduction of salaries, fees and bond interest, and depreciation and depletion writeoffs somewhat higher at $303,949, net profits prior to taxes were up at $283,430 from $57,287. Estimated tax provision of $123,000 compares with $25,000 in year before leaving net earnings applicable to capital stock of $160,430 as compared with $32,287.

Net earnings, after all charges, including depreciation and widely increased tax reserve, equal to $1.07 a share on outstanding 150,000 shares of capital stock. Net earnings for previous fiscal period were equal to 21½ cents a share on the stock. The balance sheet reveals a healthy improvement in net working capital and cash position.

West Virginia Nets $1.83

The West Virginia Pulp and Paper Company for the fiscal year ended October 31, 1942, reports net profits amounted to $2,589,248, equal after preferred dividends to $1.83 a share for 902,432 common shares, comparing with $4,270,312, or $3.70 a share, in the preceding year.

Taxes for the year were $5,237,213, comparing with $3,596,365 in the previous year, including $4,065,000 provision for Federal income and excess profits taxes, less $35,500 post-war refund, against $2,200,000 in the fiscal year to October 31, 1941.

Net sales were $52,814,029, compared with $47,520,918, an increase of 11 per cent. Thomas Luke, president, says in his report that "we are beset with many difficulties, but for our country and company we face the future with confidence."

Worthy Paper Co. Gives Bonuses

WEST SPRINGFIELD, Mass., January 4, 1943—The nearly 100 employees of the Worthy Paper Company received bonuses of $10 each at a company party in Stella's restaurant.

The Christmas presents were distributed following a dinner at which the principal speakers were Gorham Bliss, president of the company, and Reginald Lane, Australian representative of the company who has returned to this country.

Henry Marchetti was master of ceremonies. Dancing followed the party. The company has been busy with large government orders.

Celotex Nets $2.51

The Celotex Corporation for the year to October 31, reports consolidated net earnings of $1,123,967, equal, after preferred dividend requirements, to $1.53 each on 638,410 common shares, compared with $1,749,098, or $2.51 a common share for preceding year; earnings before provision for income and excess profits taxes, $3,739,902, against $2,996,888. Net sales, $23,510,364, against $19,977,155. Current assets on October 31, last, were $6,953,497 and current liabilities were $2,927,673.

Bedford Pulp Nets 73 Cents

The Bedford Pulp and Paper Company for the year to September 30, reports a net income, after $118,000 income and excess profits taxes, was $65,402, equal to 73 cents a share on common stock. For the year 1941 the company had a net income after $182,966 taxes, of $157,894 or $1.75 a common share, against $114,423 or $1.27 a common share for 1940 when taxes were $39,275.

Estate of Charles McDowell

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., January 4, 1943—In his will, which was admitted to probate last week, the late Charles McDowell, retired paper manufacturer, bequeathed to ten of his former employees a share in his estate, which is valued at more than $523,500.

In his will he wrote: "In appreciation of their long period of faithful and able performance of duties while in my employ, and of their many kindnesses to me during that period and since my retirement from business, I give and bequeath $5,000 to Frank McAndrews; $3,000 to Jasper Purcell; $1,000 each to John Schaeffer, I. P. Updegrave and Ursula Seifert; $500 each to Craig Maxwell and Joseph Howarth; $300 to Edith Brock, and $200 to Lester Long."

In addition, Mr. McDowell gave $7,500 outright to Robert H. Rodgers, long employed in Mr. McDowell's business, who acted as his personal secretary since his retirement.

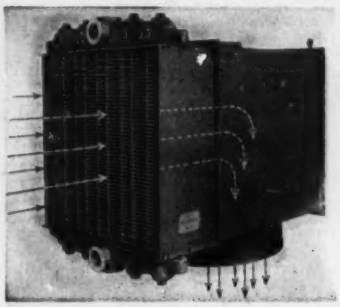
After giving small sums to several household employees, the testator bequeathed $20,000 to a sister, Rebekah McDowell Morris; $20,000 to a brother, Joseph McDowell; $10,000 to a brother, Frank; $30,000 to a nephew, Warren McDowell Morris; $5,000 to a niece, Mary C. McDowell; $15,000 to Bessie Ashman, and $1,000 each to Mrs. Ashman's son, Howard, and daughter, Emily.

After making numerous other bequests to churches and worthy charities, Mr. McDowell willed all papers and books relating to the manufacture of paper to any historical society or institution his executors may choose.

The remainder of his estate is left in trust, the income to be shared for life by his sister, Rebekah, and his brother, Joseph.

"Grid" Down-Blow Unit

The down-blow principle added to the construction of the "Grid" Unit Heater, whose heating sections are made of high test cast iron to cooperate with the war effort, is the new unit announced by D. J. Murray Manufacturing Company, Wausau, Wisc. Illustrated here is the new unit, with arrows to indicate the flow of air into, through and out of the unit. Special features of this unit include protection of the motor from the radiant heat of the unit itself, thereby preventing burning out of the motor. Perfectly controlled at all times, the "Grid" Down-Blow Unit, is sturdily constructed to last a long time. In it no electrolysis to cause corrosion can be developed, as each "fin" heating section is high test iron, cast in one piece, so that only one type metal comes into contact with steam or hot water. Patent application covering its exclusive features has been filed by the manufacturer.



PAPER TRADE JOURNAL

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Henry J. Berger

EDITOR

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COMING EVENTS IN PAPER INDUSTRY

American Paper and Pulp Association, Sixty-sixth Annual Convention and meeting, Waldorf-Astoria Hotel, New York, February 15-19.

Technical Association of the Pulp and Paper Industry, Convention, Commodore Hotel, New York, February 15-18.

National Paper Trade Association of the United States, Convention, Waldorf-Astoria Hotel, New York, February 15-18.

The New York Association Of Dealers In Paper Mills' Supplies, Annual Banquet, Commodore Hotel, New York, Tuesday, February 16.

New England Section. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

Delaware Valley Section. Technical Association of the Pulp and Paper Industry—First Friday of each month at the Engineers Club, Philadelphia, Pa.

Lake States Section. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

Kalamazoo Valley Section. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

A NEW YEAR

New high industrial production records were established by many industries and concerns the past year. In war goods a substantially higher output will be achieved this year. The year 1942 was a remarkable period but it only showed how great is the rising productive capacity of American industry. In 1943, products for war will rise to new and more remarkable levels. As more and more effort is expended for the war, proportionally less will be available for civilian use. In discussing the fortunes of business in a time of war, the Guaranty Trust Company of New York, in its review, *The Guaranty Survey*, issued December 28, states in part: "Further gains in war production are likely to be accompanied by continued declines in the output of non-essentials. The aggregate gross receipts of business concerns will be large, but the tax burden will probably prevent any significant increases in net earnings. Industrial payrolls will rise to new peaks but shortages will limit the amount that can be spent for consumers' goods."

Continuing its comment on the prospect ahead, the *Survey* goes on to say that, "For many business enterprises, a continuance of operations will become impossible. For many individuals, the inconveniences and annoyances already encountered will develop into downright hardships. The upward pressure on the price level will continue, and unremitting effort will be needed to preserve even the comparative stability that has been maintained this year. In spite of these difficulties, the country will continue to be the best fed, the best clothed and the best housed in the world. And the necessary sacrifices will be borne with the same spirit of patriotism that has made 1942 a year of achievement without parallel in our industrial history. American business is closing one of the most difficult but also one of the most successful years in its history. The standards by which that success is judged are, of course, radically different from those applied in ordinary times. Profits, dividends, wage payments, standards of living have become secondary considerations. Expanding production is still, as it always has been, a major objective, but it is production of the implements of war that is now the primary aim, not production of the goods and services that contribute directly to economic welfare."

Considering briefly the drastic readjustments required, the *Survey* states in part: "In the movement toward this altered objective, whole industries have been scrapped and have become the foundations on which new industries have been built. Many small concerns have been forced out of existence, and many more face extinction in the near future. Business of all kinds has submitted to a rigid governmental control that is alien to its habits and its settled beliefs. This control has invaded also the life of the individual, compelling millions to give up their ordinary pursuits and imposing close restrictions on the activities of the others. The effort, the hardships and the regimentation that war has forced upon the nation have been cheerfully accepted by a free people because these sacrifices are recognized as essential to the achievement of the supreme national purpose. The reward lies in visible progress toward the common goal. And the amazing strides taken during the last twelve months are abundantly rewarding. When the President told Congress in January that the country must produce 60,000 airplanes, 8,000,000 tons of merchant shipping and commensurate quantities of other war equipment during the year, the program seemed beyond the bounds of possibility. Yet it now appears that in some categories the President's goals will be attained or exceeded and that the nation's war output as a whole will come closer to the mark than seemed possible eleven months ago. Where actual accomplishment has fallen short of the aim, it has nevertheless been sufficient to give promise that, with continued effort and sacrifice, the job that has to be done can and will be done."

In analyzing business conditions and various major problems the *Survey* explains that, "The war production program as a whole, as the Office of War Information points out, has faced a series of three major problems. A year ago the critical task was the conversion of industry to war purposes. This task has been largely completed. The

second great problem was that of maintaining an adequate flow of raw materials. This problem is still present, but steps already taken are believed to have prepared the way for a practical solution. The most important need at present is to achieve balance among the many parts of the program through scheduling and production controls. This phase is expected to be followed by a fourth, that of over-all shortages of material and man power, particularly the latter. In meeting this problem, it will be necessary not only to increase the employment of women and of older and younger people but also to transfer large numbers of workers from non-war industries and to achieve the most efficient utilization of the entire labor force. The recent extension of the authority of the War Manpower Commission was a preliminary step toward meeting this prospective emergency."

Prices on Special Packs of Toilet

WASHINGTON, D. C., January 6, 1943—OPA has established maximum prices on special packs of toilet tissue for use in the United States Army on the basis of raw materials costs, conversion charges and margin, with delivery expenses added.

The formula for arriving at the ceilings on these special packs, which are made exclusively for the United States Army, is given in Order 194 under Section 1499.3 (b) of the General Maximum Price Regulation. This section provides for the pricing of new products. The order is effective January 2, 1943.

Toilet tissue ceilings are generally controlled by Maximum Price Regulation No. 266 (Certain Tissue Paper Products) but the special packs have been put under the General Maximum Price Regulation because they do not lend themselves to the pricing formula of Maximum Price Regulation No. 266. The latter is based on rolls of 650 or 1000 connected sheets of toilet tissue, while the new packs contain 100 individual sheets. The special packs are put up in waterproof jackets or envelopes in accordance with specifications of the United States Army.

Raw material costs will include the purchase price paid by the manufacturer for the jacket or envelope, plus the cost of the paper. Conversion charges are for the cost of converting the raw paper into toilet tissue sheets. The margin will cover administration and selling charges and profit. Actual freight charges to the point of delivery may be added to the maximum price.

The order provides that sellers may employ this method of determining their maximum prices for such products without first securing the authorization of OPA.

Frederick Paper Co. Burned

LIMA, Ohio, January 4, 1943—Lima, Wapakoneta and Kenton firemen on the morning of December 27 battled a downtown fire here which destroyed the building and stock of the Frederick Paper and Twine Company and threatened nearby buildings.

The fire, which started from undetermined causes at 1:30 A. M., was still burning at 9 A. M. Loss at that time was estimated unofficially at $200,000 and was expected to reach a higher figure.

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1942		Corresponding Weeks—1941	
November 21	87.0	November 22	105.3
November 28	83.5	November 29	107.7
December 5	84.9	December 6	106.9
December 12	86.7	December 13	106.3
December 19	86.8	December 20	107.3
December 26	Holiday	December 27	79.3
Week	*69.0*		

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1941	85.6	89.7	92.2	96.0	98.7	99.3	94.2
1942	104.5	103.9	102.9	100.4	95.3	87.4	75.8

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1941	101.0	99.7	105.2	106.2	100.4	97.4
1942	80.8	82.9	90.7	*87.1*	....	....

COMPARATIVE YEARLY SUMMARIES

	1935	1936	1937	1938	1939	1940	1941	1942
Year to Date..	70.2	80.2	80.5	71.7	83.5	86.1	97.3	*91.0*
Year Average.	69.9	80.4	79.8	71.5	83.4	85.6	97.4	...

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS †

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1937	83	89	89	91	88	80	69	77	72	70	57	47	75
1938	56	63	63	60	60	59	59	60	70	73	67	61	64
1939	65	73	76	74	69	73	68	77	82	91	88	77	77
1940	78	75	74	76	82	85	77	79	78	85	82	77	78
1941	81	88	89	89	91	94	92	98	95	99	98	90	92
1942	102	101	101	95	82	72	68	75	76	81	*82*	..	..

Week ending Nov. 21, 1942—83
Week ending Nov. 28, 1942—77
Week ending Dec. 5, 1942—82
Week ending Dec. 12, 1942—84
Week ending Dec. 19, 1942—85
Week ending Dec. 26, 1942—72

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Assn.

Consolidated's Sales Break Records

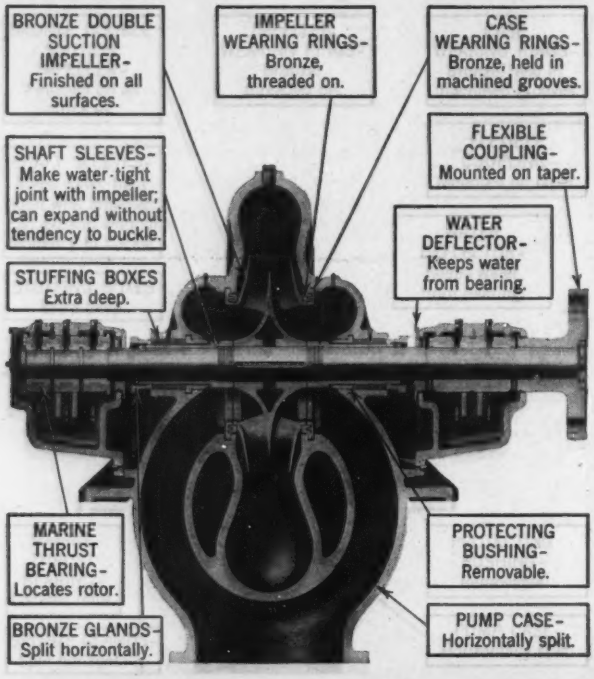
The year 1942 revealed an all-time sales and production peak for the Consolidated Water Power and Paper Company, according to President George W. Mead, whose year-end announcement says in part: "Consolidated Water Power and Paper Company manufactured in 1942 in its combined mills more paper and pulp than in any previous year in its history. It broke all former records in the dollar amount of sales. This was due primarily to the general acceptance of our coated book papers, also to the splendid efficiency of men and machinery, and to the high average rainfall in the central Wisconsin area resulting in exceptionally good records from our Wisconsin River water powers.

"Consolidated coated papers, which were developed by intensive study and experiments over a period of six years from 1931 to 1937, have been steadily gaining general acceptance by the publishing and printing industry in every part of the United States so that now many of the largest circulated periodicals in this country are using our coated paper. We might even make the modest boast that our new coated book papers have brought about a revolution in the graphic art of printing. Costly printing plants have been built to produce the magazines in almost astronomical quantities every hour of the day.

"It has been a difficult year in many respects. The genius and talent and industry of management have been strained to the utmost in all departments in order to supply the materials and machinery parts necessary to high speed production. The unions and managements have worked in a high degree of harmony and it has seemed that every man has joined in the general spirit of cooperation and pride in his work."

SUSTAINED EFFICIENCY

OF DE LAVAL PUMPS


BRONZE DOUBLE SUCTION IMPELLER- Finished on all surfaces.
IMPELLER WEARING RINGS- Bronze, threaded on.
CASE WEARING RINGS- Bronze, held in machined grooves.
FLEXIBLE COUPLING- Mounted on taper.
SHAFT SLEEVES- Make water-tight joint with impeller; can expand without tendency to buckle.
WATER DEFLECTOR- Keeps water from bearing.
STUFFING BOXES Extra deep.
MARINE THRUST BEARING- Locates rotor.
PROTECTING BUSHING- Removable.
BRONZE GLANDS- Split horizontally.
PUMP CASE- Horizontally split.

is due to proper hydraulic design, which avoids cavitation and pitting, and particularly to renewable *LABYRINTH WEARING RINGS*, which protect casing and impeller from erosion and reduce leakage from discharge to suction.

With De Laval *LABYRINTH RINGS* there is only about one-third as much leakage as between plain rings having the same radial clearance, or for the same initial efficiency De Laval pumps can have greater clearances than can pumps with flat rings. Because of the reduced leakage there is less erosion of De Laval rings than of flat rings and efficiency is better sustained. De Laval pumps which have been in continuous service for many years without renewal of parts still equal their original efficiencies, as demonstrated by numerous tests.

All parts of De Laval pumps are interchangeable on a limit gage basis and renewals ordered by number require no fitting.

State your pumping conditions and ask for Publication P-3222.

Three De Laval units in a water works plant. The largest, rated at 38,000 g.p.m. against 160 ft. at 600 r.p.m., showed on the acceptance test an overall efficiency, including motor, of 88.0 per cent.

Section through labyrinth wearing rings.

Labyrinth case protecting ring

DE LAVAL *Steam Turbine Co.*

TRENTON, N. J.

MANUFACTURERS OF TURBINES · STEAM HYDRAULIC PUMPS · CENTRIFUGAL PROPELLER ROTARY DISPLACEMENT · MOTOR MOUNTED · MIXED FLOW · ELDUCTS · SIX TRIMMO CENTRIFUGAL BLOWERS AND COMPRESSORS · GEARS · WORM WHEELS AND FLEXIBLE COUPLINGS

Section of the
TECHNICAL ASSOCIATION
OF THE PULP & PAPER INDUSTRY
Edited by R. G. Macdonald, Secretary

Factors Influencing Apparent Density and Its Effect on Paper Properties*

By James d'A. Clark[1]

Abstract

The importance of the apparent density (g./ml.) of test sheets, a basic property of pulp which affects almost all the strength and optical properties of paper, is emphasized.

Various methods relating to the measurement of density (such as air permeability, area of fibers in contact, and absorbency of the dry sheet), shrinkage during drying, and the compactibility, flexibility, and resiliency of the moist fibers are discussed, together with two new methods—one for measuring the latter property and the other for determining the wet specific volume of pulp.

It was found that pressure applied laterally to thin moist sheets reduced the thickness of a wide variety of pulps according to the one-fifth power of the pressure, and that the moist sheets all regained their thickness according to (approximately) the one-tenth power of the pressure remaining on them. There was very little difference between the compressed densities of most pulps when wet. The effect of changes in the surface tension of water and the use of alcohol in its place were also briefly studied.

Beating is shown to have a marked effect on both the wet and dry apparent densities of a fibrous structure, and it is concluded that, for all pulps and all kinds of beating, except occasionally for the initial and end periods (if the beating is carried far beyond the normal), the apparent density of the test sheets is accurately linearly proportional to the logarithm of the amount of beating.

The use of density of the test sheets as a basis for plotting the development of strength and other properties of pulp with beating is strongly advised in place of the freeness test. Although the freeness test has its place for control purposes on a given furnish with given stock-preparation equipment, too many uncertainties surround the test for it to be used, as happens frequently, as a basis for comparing either different beaters or different pulps. Apparent density constitutes and is recommended as a much sounder basis of comparison.

Using the data concerning the effect of fiber length on sheet properties (which was found not to affect the dry density of the sheets), the following general relationships for pulps appear to hold:

Rigidity factor $= k_1 d^{0.5} L^{0.5}$,
Bursting strength $= k_2 d L$,
Tensile strength $= k_3 d L^{0.5}$,
Tearing resistance $= k_4 L^{1.5}/d$ (beyond maximum), and
Lateral absorbency $= k_5 / d$,

where d is the density of the test sheets, L is the weighted average fiber length, and k_1, k_2, etc., are constants when the other factors, such as specific surface, adhesiveness, and individual fiber strength, are held constant.

The apparent density of a sheet of paper—i. e., its weight per unit volume, usually expressed as grams per ml.—is perhaps the most important fundamental factor influencing paper quality. With the exception of ream weight, every optical and physical property of paper is affected to a greater or less degree. With a given paper stock, the density of the resulting sheet is controlled by the degree of water removal, by pressure before drying and, if made on a paper machine, by calendering after drying. The reduction of the bulk of a relatively dry sheet by calendering has a very minor effect on strength properties; on the contrary, if the bulk is reduced by wet pressing, the strength of a sheet may be doubled or trebled.

In this paper, consideration will be given to the measurement of certain of these factors which largely contribute to, or are influenced by, the density of the uncalendered sheet structure. They include porosity, absorbency, and opacity of the dried sheet, shrinkage during drying, and the compactability, flexibility, and resiliency of the wet fibrous mat.

Measurements of Density

The importance of density or the specific volume (the inverse property) of paper was recognized in a proposal made in 1902 for expressing test results in a system designated as "CBS" units *(1)*. Calculations of specific strength, by relating the strength figures to the solid cross-sectional area of the paper, were proposed, the percentage of air space and volume of

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[1] Member, TAPPI; Research Associate, The Institute of Paper Chemistry, Appleton, Wis.

solids being taken into account. The papers by Baird and co-workers *(2)*, and especially the work of Doughty *(3)* at the Forest Products Laboratory a decade ago, again focussed attention on the importance of density under a new name, "solid fraction," which is the inverse of the old CBS unit of "bulk" and is actually 0.67 times the "density" or "apparent density" of a sheet of paper. Fortunately, there are no longer ambiguities in connection with the definition of these last quantities as applied to paper, because in recent years the condition for the measurement of the thickness of paper has been internationally standardized as requiring the plunger on the micrometer to have a diameter of about 15 mm. under a closing pressure of about half an atmosphere; consequently, the apparent density of paper is now generally understood to be the ratio of the weight of a volume of paper, measured under these conditions, to the weight of the same volume of water. In the case of the apparent density of pulp test sheets, the individual sheet thickness is found by measuring several thicknesses together under these conditions, as prescribed in the official standards in the United States, Canada, and Great Britain.

Air Permeability

The measurements of porosity or air permeability, which is related to the presence and size of pores in the sheet, requires little comment as this property may now be measured very accurately by Carson's adaptation of the Emanueli instrument *(4)*. Baird and others *(2, 5)* also have described another modification. More widely used, however, is the Gurley densometer *(6)* which is satisfactory for papers in the medium porosity range. One with a 20-ounce cylinder was used for the results quoted in the present work, but the model having a lighter cylinder would have been preferred, especially for the more porous sheets.

Opacity and Area of Fibers in Contact

Opacity readings, which will be given later, were obtained by the Davis or Bausch and Lomb opacimeter *(7)*. In the last few years, Judd *(8)* and others *(9, 10)* have made significant contributions toward clarifying the nature of the opacity test. Recently, also, Parsons *(11)* has shown that the light-scattering coefficient is a linear function of the external specific surface of the pulp, and that the percentage of the external surface of fibers in actual contact in a sheet of paper may be measured by obtaining the ratio of its scattering coefficient and that of the same pulp formed into a sheet, using butyl alcohol as the liquid medium, whereby a fluffy sheet having very little contact between the fibers is obtained. Parsons used the new specific surface method developed by the writer *(12)* and found, for example, that an unbeaten sulphite pulp which had a specific surface of 11,900 sq. cm./g., when made into a sheet by the TAPPI Standard method, had 28% of this surface in optical contact. After beating for 15 seconds in a standard beater, the specific surface rose to 12,700 sq. cm./g., 56% being in optical contact in the sheets. With the same pulp, but unbeaten, a pressure of 5,000 pounds on the moist sheets was required to raise the area per gram in optical contact to the same quantity—i. e., about 7,000 sq. cm./g. The tensile strength of the pressed sheets was then approximately 15% less than that of the beaten sheets for the same specific area in contact. This is an interesting point and is probably caused by the presence of part of the primary wall on the unbeaten fibers and the absence of fibrills on these portions.

Absorbency

The significance of the usual absorbency test—i. e., the timing of the disappearance of a small fixed quantity of water dropped on the surface of the sheet—as affected by its structure, is not well understood, because it is a complex function of the lateral and transverse pores and capillaries. A satisfactory means of placing a predetermined small volume of water on the surface of the paper sample for this test has been described by Carson and Worthington *(13)*, and another method has been proposed by Reese and Youtz *(14)*.

An absorbency test affected by sheet structure in a less complex way is the old so-called Klemm test, which apparently was developed by Winkler *(15)*. It has been shown *(16-18)* that the height to which any liquid wetting the fibers rises in a fixed time in a strip of paper dipped in a liquid having a given viscosity, is approximately proportional to the square root of the equivalent pore radii of the longitudinal pores in the paper which, in turn, are dependent on the bulk of the sheet. Where the density of the sheet structure cannot be measured directly, as with creped or embossed papers, this test would seem to form a satisfactory basis for indirectly obtaining a measure of the true bulk of a sheet. Several satisfactory pieces of apparatus have been described for this purpose *(19, 20)*. However, the test can be simply, if rather crudely, performed by suspending the strips vertically over an empty shallow dish, pouring in some water, and measuring the height to which the water rises in a given time, such as 5 or 10 minutes. Marking the strip down its center with an indelible pencil line makes the water level in the strip easy to read.

Shrinkage of the Wet Sheet

Bell *(21)* carried out a very extensive investigation of the shrinkage of 6-gram (dry weight) cylindrical cakes of different pulps made under a number of interesting and unusual conditions. He measured their shrinkage, both by volume and by weight, and obtained from the percentage shrinkage a factor which he called the "cohesion number." The writer does not see any essential difference between this as a measure of shrinkage and the shrinkage of the surface of a test sheet of the pulp, except that one is on a volume basis and the other on a linear basis. Because of the simplicity of the latter test, it should suffice, except for very special purposes.

For measuring linear shrinkage, a gage was made from a pair of thin nails driven in a hardwood lath 15 cm. apart, with their edges filed to chisel points exactly 150 mm. apart. The points are wiped on the moistened point of an indelible pencil, and two or three imprints are made across the surface of a standard test sheet after pressing. The sheet is removed from the plate, dried, and conditioned, and the new distances between the marks accurately measured and averaged.

Properties of the pulp, which result in the formation of a dense or less dense sheet structure during the drying of the sheet, are not clearly comprehended. Fiber length appears to be a negligible factor *(22)*, but the presence of a lot of debris, the fineness and flexibility of the fibers, and their external specific surface are major factors. It also seems reasonable to

expect that the flexibility of the wet fibers would be an important factor *(22)*.

Water-Holding Capacity of Moist Pulps

Strachan *(23)* suggested that the specific volume of a wet pulp under a pressure of more than 10 p.s.i. was a measure of the quantity of physically bound water, or "water of hydration." Bell *(21)* reported little success with this, as very small differences were obtained between beaten and unbeaten pulp after pressing at 200 p.s.i. pressure for 10 to 20 minutes. The beaten pulp gave the higher volume but, if the pulps were pressed for about 4 hours or until they reached equilibrium, no significant differences were found. The writer (unpublished work) has tried to find differences in the weights of standard test sheets made from unbeaten and well-beaten pulps, both after couching and after a single pressing, but was unable to obtain conclusive results. However, Jahn *(24)* got fairly good results for a pulp by determining the moisture content immediately after couching. He found that the moisture content increased uniformly with beating but that this difference disappeared after prolonged pressure.

Resiliency of Moist Pulps

Campbell *(25)* suggested that a test for wet fiber flexibility was the ratio of the resistance calculated from the flow of water through a pulp mat under a fairly high head (as in the British sheet machine) and that calculated from the resistance to the flow of water through a pulp mat under a relatively low head (as in the Canadian standard freeness tester). For groundwood, this ratio is about 1.5, whereas for chemical pulps it is about 3. However, the results are variable and not very conclusive.

Qviller *(26)* has published investigations on the volume of stock after it was subjected to a range of high and low pressures. He showed that, for the pulp examined, the pressure (p) required to reach a given consistency (c) was expressed by the formula, $p = 0.024\ c^{3.24}$. If t is the thickness of the mat, c is proportional to $1/t$, and so $tp^{0.31} = k$ (a constant). If the pressure was released, the consistency fell—i. e., the volume increased by about 17% because of the reabsorption of expressed water and other factors. He also discussed the "swelling pressure," which is measured by the pressure (suction) required to remove the water from a pulp mat; this is, of course, dependent on the size of the capillaries (*see* also Stamm *(27)*).

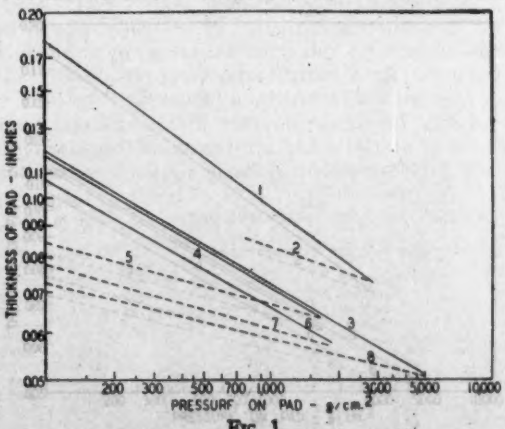

FIG. 1

Effect of Pressure on Moist Pulps. —— Compression Line. - - - Recovery line. 1, 2. Groundwood; 3, 8. Unbleached West Coast Sulphite; 4, 5. Bleached Southern Kraft; 6, 7. Bleached Southern Gum.

Seborg, Simmonds, and Baird *(28)* have described a method of measuring the recovery of pulp from compressive deformation. They found that the percentage recovery was somewhat dependent (inversely) on the temperature and markedly dependent on the weight of the pulp used for the test. The conditions selected by them were as follows: Six grams of pulp were pressed at 120 p.s.i. until 90% of the ultimate compression was obtained (this was to save time, as the mat continued to compress very slowly for a long period), the expressed water was removed, and the vertical expansion of the cylindrical cake of pulp was measured 5 minutes after relieving the pressure. They showed, as pointed out by Brown *(29)* and Buckingham *(30)*, that the recovery decreased very quickly (up to 50%) in the early stages of beating. Large differences (33 to 48% or more) were obtained with different pulps, and there appeared to be some degree of correlation between these values and the tear, burst, and tensile strength of the pulps when progressively beaten and made into sheets. Summerwood fibers from loblolly pine had a 65.6% recovery as against 41.6% for the thin, ribbon-like springwood fibers, and they suggested that the test might be a relative measure of the flexibility of pulp fibers.

New Method for Lateral Resiliency

About the same time as the above was published, the writer (then at the Scott Paper Company) became interested in the possibilities of measuring the flexibility of fibers and, with the collaboration of K. W. Arnold, a modified and simpler technique was devised. This comprised making a standard test sheet of various pulps, both beaten and unbeaten, and folding the moist couched sheet into a number of thicknesses to give a pad of the material for testing. A disk of the pad of moist sheets was cut out by means of a sharp cork borer and the pellet was inserted between the jaws of a sensitive micrometer arranged so that the closing pressure could be varied by adding weights directly to the shaft of the pressure foot. The thicknesses of the pads could thus be accurately measured under various conditions. Summaries of a few of the tests by Arnold are given in the experimental section (Experiments A and B), some of which are illustrated in Fig. 1. They show that, when the fibers are all aligned at right angles to the pressure, as they must be when having been previously made into thin test sheets, no marked differences are exhibited by widely different pulps, whether beaten or unbeaten. The compression curves are such that $tp^{0.2} = k$, and the recovery curves are such that $tp^{0.1} = k$, where t is the thickness of the pad, p the pressure, and k a constant. Consequently, we must attribute most of the differences between different pulps as shown by Seborg, Simmonds, and Baird *(28)* to an endwise flexing of those fibers which lie more or less in the axial direction of the very thick cakes which they used for testing. Moreover, because of the appreciable effect of surface tension on the expansion of the cakes after having the surplus water removed as indicated in our experiments, it is doubtful whether their method can be considered as constituting more than a somewhat dubious qualitative test of fiber flexibility between different pulps. However, for pulps resulting in a capillary structure in the cake of the same type and dimensions (which is not the case where springwood fibers are compared with summer-

wood fibers), their test would appear to be quite a valid one for wet flexibility.

Wet Specific Volume

The old Klemm sedimentation test *(31)*—forerunner of the modern freeness tester—depended upon the measurement of the wet specific volume of stock after drainage, using little or no pressure to compact the wet mat. The range of results was from approximately 9 ml./g. for very heavily beaten stock to about 27 ml./g. for raw unbeaten stocks. The Klemm sedimentation test suffered from a number of drawbacks, chief among which was the difficulty of securing a precise reading for the volume of the stock after draining, because of the irregularities of the surface of the stock. Moreover, this difficulty was aggravated by the friction of the side walls of the glass tube on the fibers, especially when drainage was nearly complete. Accordingly, a simple piece of apparatus was constructed to obviate this particular difficulty and to enable tests to be made with a greater degree of precision. This is illustrated in Fig. 2. A piece of 60x60-mesh wire was cemented to the lower or wider end of a conical glass tube, 7 inches long. For a test, this was closed by holding it firmly on a large rubber stopper, while a 2- or 3-gram sample of pulp in 300 ml. of water was poured in and stirred. The tube and its contents were raised to allow the water to drain and, as soon as dripping from the screen ceased, the stock and tube were weighed and the volume of the wet stock was obtained by difference. For an unbeaten sulphite pulp, successive reading were 28.8, 28.2, 28.2, and 28.7 ml./g.; for a mixed beaten sulphite and very fine groundwood stock, the values were 9.7, 8.7, and 8.7 ml/g. The agreement between successive readings, therefore, was not very good. The end point was also somewhat uncertain, because the period between the last drops from the screen was by no means uniform. Better results might have been obtained by waiting a longer time for the end point and also by carrying out the experiments with a careful temperature control.

Upon removing the water from 3.0 grams of the same sulphite pulp with an air pressure corresponding to 24 cm. of water, the wet specific volume fell to 12.1 ml./g.; in the case of the very fine stock mentioned above, the specific volume dropped to 7.7 ml./g. From these results, it seemed clear that the modified test was open to question, because not only did the range between widely different pulps diminish, but it also became evident that a coarse or wiry pulp would have nearly all its capillary water displaced by air, which would not be the case with a very fine pulp. Under such conditions, the weights of the pulps and remaining water would not be a true index of their wet volumes.

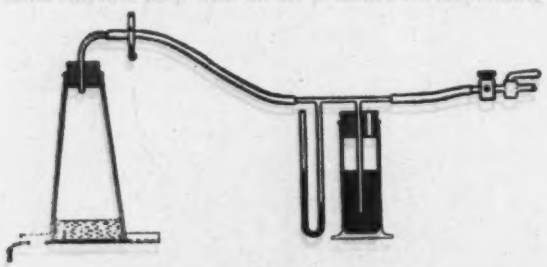

FIG. 2
Diagrammatic Arrangement of Fiber Volume Test

To have the test conform more nearly to the making of sheets of paper, either on sheet-forming equipment, or on the paper machine, a new procedure was devised for obtaining the wet specific volume of 3 grams of stock after driving out the surplus water from the sample for one minute with a moderate air pressure and then allowing the pad to reabsorb water by capillary action for four minutes. This period proved enough to allow the mat to become completely saturated. The air was supplied at such a rate as to build up a pressure of 80 cm. of water (5.9 cm. of mercury) when connected to a bottle having a volume of 500 ml. in 10±1 seconds.

During the test, except for the very lowest pulps, the air pressure did not rise anywhere near the maximum value given. After standing the cylinder on a coarse wire mesh just flooded with water until equilibrium was reached, the cylinder and contents were weighed to give the wet weight of the pulp; the moist pad of pulp was then removed, squeezed, dried in an oven, and weighed to give its dry weight. The wet specific volume was calculated as the ratio of the wet to the dry weight of the pad. The temperature of the water employed in this test was found to have an appreciable effect on the results (about 0.5 ml./g. less per ° C. rise) so that the temperature was kept constant at about 25° C.

Experimental data relating to this and the other tests with some discussion, are given in the next section.

Experimental

A. The Effect of Pressure on the Density and Recovery of Test Sheets of Pulp

The following pulps, which are selected so as to include the widest variety available, were made up into test sheets of approximately 60 g./sq. m., folded into 12 thicknesses, cut into pellets with a cork borer of 11.3-mm. internal diameter (1 sq. cm.), placed in a micrometer, and subjected to increasing dead-weight pressures. At the maximum compression all excess moisture was absorbed by a blotter and the load was gradually removed. For the initial and end points, pressures of 100 g./sq. m. were used, because lighter loads gave somewhat variable results for the initial

TABLE I.—EFFECT OF PRESSURE ON THICKNESS OF WET PULP SHEETS

D = readings taken under increasing pressure
R = readings taken under decreasing pressure from the heaviest pressure used

Pulp Load g./sq. cm.	West Coast Unbleached Sulphite		Groundwood		Bleached Southern Pine Kraft		Bleached Southern Gum Kraft		Bleached Finnish Sulphite Beaten 4 r.p.g.		Bleached Finnish Sulphite Beaten 16 r.p.g.	
	D	R	D	R	D	R	D	R	D	R	D	R
100	114	72.0	177	..	112.0	84.0	108.5	78.0	113	81	98	74.5
200	104	68.2	154	..	102.5	78.8	94.5	73.5	101	78	88.5	....
300	96	65.2	....	..	94.5	76.0	88.0	70.0	93	75.5	82	68.0
740	79	61.4	....	87	78.2	68.4	70.0	63.5	73	70.5	65.5	62.5
1040	74	58.5	100	84	71.8	65.8	64.0	60.2	68.5	....	60.5	....
1540	66	56.2	92.5	80	66.5	63.0	59.5	57.5	....	....	....	....
2040	62	54.5	82	75	61.5	....	55.5	....	....	....	....	....
3040	58	52.5	72.5	..	....	....	....	....	....	....	....	....
4040	54	52.0	....	..	....	....	....	....	....	....	....	....
5040	51.5	....	....	..	....	....	....	....	....	....	....	....

reading. Readings (in thousandths of an inch) were taken after five minutes under pressure (Table I).

When the results are plotted on log-log paper (Figure 1), it will be seen that the compression graphs are straight lines, almost all being parallel with slopes, so that $tp^{0.2} = k$; the recovery curves are nearly all parallel straight lines, so that $tp^{0.1} = k$.

About a dozen other pulps were similarly tested and, without exception, the slopes were within the range shown. The only noticeable differences were the initial and end points under the 100 g./sq. cm. load; although reproducible within 5%, they did not show a sufficient differentiation between various chemical pulps to be of much value. From these results, there seem to be very little doubt that, as far as the lateral compressibility and resiliency of most wet pulps are concerned, there are no appreciable differences.

B. The Effect of Surface Tension and Dehydration on the Lateral Compressibility and Recovery of Wet Pulps

The tests given in Table II were carried out in duplicate on a Norwegian bleached sulphite pulp, beaten to different degrees, and on a fairly fine Canadian groundwood pulp. Water containing a little wetting-out agent was used for the experiments on the southern pine bleached sulphate pulp.

A pressure of 2040 grams was applied to a wet sheet pellet 15 mm. in diameter, left for 5 minutes, and the thickness read. The weight was removed and after 5 minutes the thickness was read under a pressure of 100 grams, both by keeping the pellet flooded during expansion (wet) and also by blotting the surplus water from the pellet before expansion (moist), the latter as in Experiment A. The tests were repeated, using ethyl alcohol in place of water. The percentage recoveries are based on the thickness of the pad while under compression.

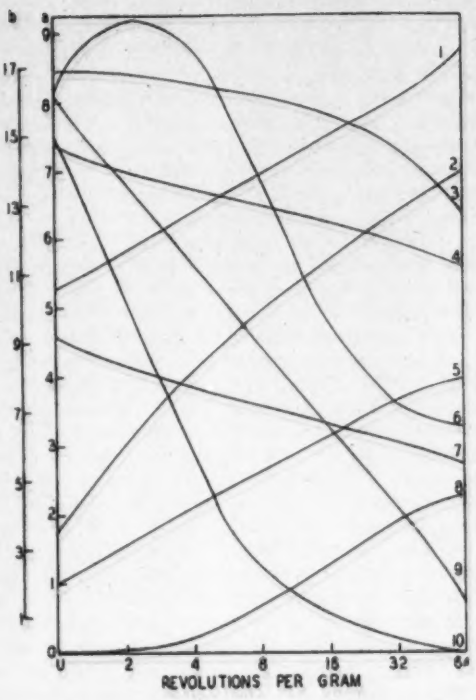

Fig. 3

Effect of Beating on Pulp Properties. 1. Density (a/10); 2. Tensile (a × 1000); 3. Wet Specific Volume (b); 4. Opacity (a × 10); 5. Burst (a × 10); 6. Tear (a × 10); 7. Specific Volume (b × 0.2); 8. Fold (a × 100); 9. Klemm Test (a × 10); 10. Porosity (b × 10).

TABLE II.—INFLUENCE OF VARIOUS FACTORS ON RECOVERY OF WET PULP SHEETS

(1) and (2) refer to duplicate experiments

Beating r.p.g.	Thickness (0.001 in.) Under Load Using Water	Alcohol	% Recovery (Water) Wet (1)	Wet (2)	Moist (1)	Moist (2)	% Recovery (Alcohol) Wet (1)	Wet (2)	Moist (1)	Moist (2)
			Bleached Sulphite							
0	64	70	127	117	31	30	77	75	37	36
8	63	70	125	118	25	24	82	77	30	28
16	65	70	128	135	22	23	70	71	25	26
32	63	71	124	128	26	28	75	..	24	26
			Groundwood							
..	76	52	150	147	18	15	156	152	36	31
			Bleached Southern Pine Kraft							
									% Recovery with Water and Wetting-Out Agent	
..	..	..	...	...	25	26	..	..	34	36

With minor variations, it will be seen from Table II that the recovery law, $tp^{0.1} = k$, holds quite well with water for all the pulps tested in the moist condition. With alcohol, however, the indications are that beating decreases the percentage recovery somewhat. The marked thinness of the alcohol-wetted pellet of groundwood under load is curious and seems to indicate that either water or perhaps an alcohol-soluble material plays a very great part in its bulkiness.

The influence of a reduction in the surface tension of water on the moist recovery is seen to be quite marked; by keeping the pellet wet and thus eliminating surface tension effects entirely, the percentage recovery becomes relatively very great.

TABLE III.—INFLUENCE OF WET PRESSURE AND BEATING ON BLEACHED SULPHITE

	Unbeaten			Beaten			
	Light Pressure	Standard	Heavy Pressure	4 r.p.g.	8 r.p.g.	32 r.p.g.	64 r.p.g.
Basis wt., g./sq. cm.	60.5	61.5	65	61.1	62.5	60.0	59.7
Apparent specific volume (Water = 1)	3.36	1.84	1.29	1.55	1.45	1.24	1.13
Apparent density (Water = 1)	0.298	0.530	0.775	0.645	0.690	0.805	0.885
Klemm test, mm./10 min.	140+	81	44	55	44	22	7
Burst factor, g./sq. cm./g./sq. m.	....	10	....	21.7	25.8	37.6	40.0
Tear factor, 100 g./sq. m.	....	162	....	176	138	72	66
Breaking length, m.	825	1750	2370	3880	5120	6300	7050
Porosity (Gurley), ml./sec.	....	150	....	60	24	3.4	0.25
Absorbency, sec./0.1 cc.	....	19	....	55	180	600	1200+
Wet specific volume, ml./g.	....	16.9	....	16.4	16.4	14.7	13.7
Opacity (TAPPI corrected to 60 g./sq. m. sheets)	76	74	69	67	65	60	[illegible]
Rigidity factor *	3.45	36	118	81	98	133	144
Fold (M.I.T.)	....	3	....	18	64	187	227
Shrinkage, %	....	2.7	....	....	3.0	4.7	8.3

* Proportional to Young's modulus. Determined according to method proposed by the author (Paper Trade J. 100, no. 13:41 (March 28, 1935)), on which TAPPI Standard T 451 m-40 is based.

C. The Effect of Beating on the Wet and Dry Apparent Density of Pulp

A number of physical tests (reported in Table III) were carried out on a sample of bleached west coast sulphite, after disintegrating and beating in a laboratory kollergang for varying r.p.g. (an abbreviation for revolutions of the kollergang per gram of pulp in the apparatus; this may be regarded as a unit of beating). Between 4 and 8 r.p.g. would be used normally in a mill making a bond paper.

In addition to making standard (TAPPI) test sheets, other sheets were made from unbeaten stock with the minimum possible amount of pressing (the press was not used). Another lot was prepared from the same unbeaten stock, using 200 p.s.i. for both the first and second pressings, with a third pressing at 200 p.s.i. with fresh, dry blotters. Pertinent data from this test are plotted in Fig. 3. One of the very interesting and important things to notice is that, except for the point at 64 r.p.g. when the pulp is very well beaten, the plot of the apparent density is a straight line. This observation will be discussed further in the next experiment.

It will be noted also from Fig. 3 that the Klemm absorbency test, except for the last point, is also a straight line, confirming the view already discussed—namely, that the test is an indirect inverse measure of apparent density. The porosity figures during the first part of the beating period also yield a fairly straight plot and, as might be expected from their nature, also appear to be an indirect measure of the apparent density of the sheets. The absorbency test is largely influenced by the wetting ability of water for the test sheet and, to a minor extent, by structure. Beating not only compacts the sheets but also probably squeezes out some resins and impurities from within the fibers and, as both these factors decrease the absorbency very appreciably, a linear relationship can scarcely be expected.

The wet specific volume test does not change very much until the end of the beating period. As has been shown by the author *(22)*, this test is changed substantially by both beating and fiber length, but although, surprisingly enough, beating markedly increases the density of the dry sheet, neither it nor the Klemm absorbency test is affected at all by fiber length when the latter is decreased from 3 to 0.5 mm. However, the density is reduced slightly (3%) when the sheet is made from a mixture of equal parts of the longest and shortest fibers.

TABLE IV.—INCREASE IN SHEET DENSITY OF UNBLEACHED SULPHITE WITH BEATING IN VARIOUS WAYS

Beating Apparatus and Consistency	Beating Amount	Drainage Time, sec.	Density, g./ml.	Increase in Density, g./cc.
Kollergang, 3%	0 r.p.g.	5.2	0.605	...
66 g. pulp previously	1	5.2	.635	0.028
disintegrated at 3%	2	5.2	.650	.027
for 75,000 revolutions	4	5.5	.675	.025
in TAPPI standard	8	5.5	.700	.025
disintegrator (T 205	16	5.6	.735	.035
m)	32	7.6	.763	.028
	64	20.7	.826	.063
	128	80.8	.915	.089
Kollergang, 3% as above	0 r.p.g.	4.8	.559	...
Pulp disintegrated	4	5.1	.654	.095
10,000 revolutions only	8	5.2	.683	.029
	16	5.6	.725	.042
	32	6.8	.775	.050
	64	18.6	.835	.065
Laboratory refiner, 0-4%	0 min.	4.6	.546	...
8 g. pulp previously	2	6.1	.692	.144
disintegrated at 0.8%	4	15.2	.758	.066
for 10,000 revolutions	8	47.1	.820	.062
	16	88.8	.892	.072
Laboratory refiner, 1.6%	0 min.	4.6	.532	...
32 g. pulp disintegrated	2	5.3	.648	.116
at 1.6% for 10,000 rev-	4	6.8	.700	.052
olutions	8	14.9	.768	.068
	16	71.5	.845	.077
Laboratory refiner, 2.5%	0 min.	4.7	.545	...
64 g. pulp disintegrated	4	5.2	.689	.146
at 2.5% for 10,000 rev-	8	7.7	.725	.036
olutions	16	10.8	.770	.048
	32	131.0	.892	.122
Valley beater (T 200 m),	0 min.	4.5	.575	...
but disintegrated for	20	5.0	.640	.065
15 minutes; then 10 lb.	40	5.5	.665	.025
weight added	(60)	(6.3)	(.700)	...
	80	8.0	.715	.050
	(100)	(10.7)	(.730)	...
	160	16.4	.752	.037
	(250)	(62.2)	(.791)	(.039)

D. The Development of Density With Beating

Some years ago the author published *(32)* a graph showing the development of the density of a variety of different pulps with the logarithm of the amount of beating; later *(33)* additional data were presented on the change of the specific volume of several other pulps. If all those density data are plotted against the logarithm of the amount of beating, it will be found that (with the occasional exception of only the first or unbeaten points for a few pulps—notably manila, some rag, and some alpha pulps—presumably where the exterior structure of the fiber is notably changed during the initial beating period) the density increases linearly with the logarithm of the amount of beating. It is true, of course, that the graph cannot continue to be straight indefinitely, because the ultimate sheet density cannot exceed that of cellulose—i. e., 1.55. Furthermore, occasionally toward the end of an extended beating period, the structure of the fiber appears to break down rather suddenly, with a temporary slightly accelerated rise in the rate of increase of the density with beating. In commercial practice, however, except for some specialties such as condenser or cigarette paper, beating does not approach the point where the fibers are completely broken down; for normal practical purposes, therefore, this semilog linear relationship holds good.

In view of the fact that the above observation apply only to the laboratory kollergang, the question arises as to the validity of this rule with other types of beating equipment. The data given in Table IV (obtained by S. P. Moore of the Scott Paper Company), which apply to a medium-strong unbleached Finnish sulphite pulp, are given as one example. Making allowance for possible experimental deviations of 1 or 2%, it will be seen that, after the first point, in each case over the range of normal commercial beating, the increase in density may be regarded as linear with each doubling of the amount of beating. It is worthy of note that when, as in the second set of results, the pulp is not given a substantial preliminary disintegration as was done in the first kollergang results quoted, the increase in the density between the first and second points is relatively much larger. It is believed that this is occasioned by the initial removal of part of the outer skin or primary wall of the fibers, which, as has been shown by the author *(12)*, is readily accomplished with the simultaneous development of minute fibrillation on the exposed secondary wall and a consequently enhanced compacting of the sheet.

The tendency of the increase in density to accelerate at the last points on the curve of very well-beaten stock is, as has already been suggested, probably caused by a breaking up of the structure of the fiber. This point may be judged from a consideration of the drainage time required to form the test sheets which have been included in Table IV.

E. Influence of Density on Sheet Properties

The data plotted as solid lines in Fig. 4 are those

published by Doughty *(34)* (from Fig. 6 in his final paper of the series) which have been recalculated to the TAPPI standard basis (T 205 m) and his "solid fractions" converted to densities (g./ml.). To the figure have been added results obtained in Experiment C.

Like Doughty, Strachan *(35)* also noted that the bursting strength of a sheet is proportional to its density. It now appears that both the burst and tensile strength are proportional to the density; by replotting the data on log-log paper, the rigidity factor seems to be proportional to the square root of the density. Beyond the maxima in the tear and fold curves, and for the entire Klemm absorbency test, the data appear to be, quite accurately, inversely proportioned to the density. These relationships are, of course, concerned with the density of the test sheets after forming according to some standard condition and without calendering the sheets.

According to this, the following relationships appear to be established:

Rigidity factor $= k_1 d^{0.5}$
Bursting strength $= k_2 d$
Tensile strength $= k_3 d$
Tearing resistance $= k_4 d$ (beyond maximum)
Klemm test (lateral absorbency) $= k_5 d$

Conclusions

Factors Affecting Density

These experiments show that density plays a very important part in the properties of paper and it would appear that, as yet, a direct measurement of the corresponding properties of individual fibers or wet pulp which affect the density has not been very successful. There does not seem to be very much of a relationship between the density or the lateral resiliency of the sheet structure, while still wet, and the density of the dry sheet. Applied pressure results in the compression of a moist, *thin* sheet of any pulp according to its one-fifth power, and the sheet regains its thickness according to (approximately) the one-tenth power of the pressure remaining on it. The higher exponent of the pressure in the relationship obtained by Qviller —i. e., $tp^{0.31} = k$—and the difference between pulps found by Seborg, Simmonds, and Baird may be explained by the fact that they used thick sheets which, because of the random orientation of their fibers in a vertical plane, are more compressible and probably vary in their compressibilities. There is no appreciable difference in the compressed densities or the compressibilities of thin sheets made from most pulps after wetting.

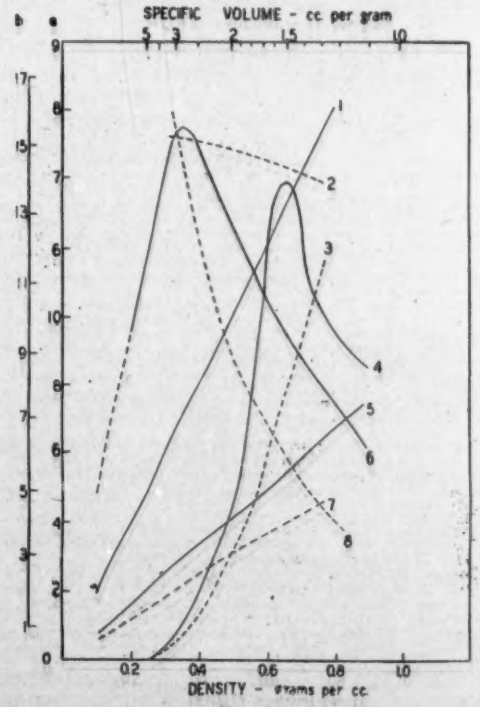

FIG. 4

Effect of Density on Properties. —— Doughty's Data. --- Data for Bleached Sulphite. 1. Breaking Length (a × 1000); 2. Opacity (a × 10); 3. Rigidity Factor (b); 4. Fold (a × 100); 5. Burst Factor (a × 10); 6. Tear Factor (b × 10); 7. Breaking Length (a × 100); 8. Klemm Test (b).

The wet specific volume of pulp, as measured by the modified Klemm sedimentation procedure, bears little relationship to the specific volume or the density of dry test sheets. Further, their dry densities are not appreciably affected by changes in fiber length. However, when comparatively long artificial silk fibers are made into sheets, fiber length and sheet density appear to have an approximately inverse linear relationship *(22)*. This occurrence may be explained by the following hypothesis.

Influence of Fibrillation

The density of a test sheet is controlled by three primary factors: fiber length, wet flexibility of the fibers, and surface tension effects. These, in turn, are dependent not only on the fineness of the fibers but also on the degree of fibrillation of their surfaces and the presence of any adhesive material which would serve to bind or tend to hold the fibers together during the drying operation. Under favorable circumstances, presumably in the case of ordinary pulp fibers, the length of the fibers plays a minor role as their surfaces are usually covered with fibrillae; these, as Campbell has shown *(36)*, could easily increase the surface tension effect beyond the point where the bulking tendency of increased fiber length makes little, if any, difference. Wet pulp fibers are very flexible in any case. If the wet fiber flexibility is furthen increased by rubbing or beating the fibers, they can be drawn into a denser mat by the forces involved—perhaps because of increased lateral flexibility. The artificial fibers, on the contrary, are devoid of fibrillation, so that a relatively bulky sheet results.

In connection with the effect of changes in surface tension with the use of wetting-out agents, Dixon *(27)* and Harrison *(38)* have both shown clearly that very small quantities of materials which reduce the surface tension, also reduce the bursting and tensile strengths appreciably and increase the tear. For small quantities of the material, these effects may be ascribed primarily to the resulting changes of density caused by the decrease of surface tension and, for larger quantities, probably to the blocking of the hydroxyl groups as they suggest.

Relationship between Density and Beating Degree

It has been shown that, when the density of the test sheets is plotted against the logarithm of the amount of beating, a straight line results, except occasionally at the beginning of the beating when it is presumed that the primary wall on the fibers interferes (as has been discussed) and occasionally at the end of a protracted beating period when the fibers become severely mashed or reticulated. Because the specific volume or

bulk of the sheet is the reciprocal of its density, there is also a substantial degree of linearity when the specific volume is plotted against the logarithm of the amount of beating, especially at the intermediate points. However, experience has shown (as in Experiment C) that, as a rule, especially at the first part of a beating curve, a closer degree of linearity is obtained when the density of the sheet, rather than the bulk, is used for this purpose; consequently, the former is to be preferred.

It would appear that, by using density as a basis for plotting beating tests, the performance of different pieces of laboratory or commercial beating equipment may be readily compared. This is a far better and more fundamental basis of comparison than the use of the freeness test for this purpose; not only do changes in freeness depend strictly on the type of instrument used but, by its very nature, it is a highly arbitrary test. In certain cases, after treating a pulp, two different freeness testers may show divergent or even contradictory results *(39, 40)*; consequently, the use of the freeness tester is best confined solely to the control testing of a given furnish prepared by a given stock-preparation system.

Fallacy of Freeness as a Basis of Comparison

Among the factors which will influence the freeness reading are the following: *(a)* fiber length reduction (which, as has been shown, has no effect on sheet density but has an appreciable effect on the density of the wet mat; this, in turn, undoubtedly influences the freeness reading very decidedly); *(b)* the presence of small quantities of fine debris, which may either serve to plug the pores in the mat of fibers and considerably reduce the freeness reading or, as has been noted *(40)*, pass through the fibrous mat and the perforations in the bottom of the instrument and so remain ineffective (*small* quantities of fine debris do not influence the density very much *(41)*); *(c)* a change of wet fiber flexibility; *(d)* an increase in coarse fibrillation; and *(e)* an increase in submicroscopic fibrillation brought about by removal of the primary wall *(12)*, which material, together with loosened fibrils, forms the fine debris. The last three factors influence both tests. Because of the uncertainty of the magnitude of the first two factors, it is not legitimate to conclude, if one beater or refiner gives a stronger sheet from some stock at a given freeness, than another, that the former beater is necessarily superior as regards the quality of beating. However, on the contrary, it may be concluded that, if test sheets are made from the same furnish from different beaters or refiners, the equipment which produces the stronger sheet at the same density, *per se*, is the better "quality" beater. Experiments along these lines indicate that the best "quality" beater is a plain agitator or a stock pump; next is the laboratory beater and then the laboratory kollergang, together with the average of a large number of different kinds of commercial beating equipment. Similarly, one pulp is by no means necessarily stronger or "better" than another if it is stronger after being beaten to the same freeness. It is safe to conclude, however, that one pulp *is* "better" than another if, when made into test sheets according to the same procedure, it is the stronger when both pulps are beaten so that the test sheets have the same specific volume or apparent density.

General Relationships

Using other available data *(22)* on the effect of fiber length on various sheet properties and those from the present work, as the density was found to be independent of length, these findings may be combined and expressed in the following relationships which appear to have general application:

Rigidity factor $= k_1 d^{0.5} L^{0.5}$,
Bursting strength $= k_2 d L$,
Tensile strength $= k_3 d L^{0.5}$
Tearing resistance $= k_4 L^{1.5}/d$ (beyond maximum), and
Klemm test (lateral absorbency) $= k_5/d$,

where d is the density of the test sheets, L is the weighted average length by weight of the pulp fibers, and k_1, k_2, etc., are constants if the other pulp factors, such as specific surface, adhesiveness and individual fiber strength are constant. It is hoped to examine these "k" factors in another paper.

Literature Cited

1. Cross, C. F., Bevan, E. J., Beadle, Clayton, and Sindall, R. W. "The C. B. S. units and standard paper tests." London, Woodpulp, Limited, 1903. 26 p.
2. Baird, Parker K., and Hrubesky, C. E., *Paper Trade J.* 91, no. 4:48-51 (July 24, 1930); *Tech. Assoc. Papers* 13:274-277 (1930).
3. Doughty, Randall H. "The relation of sheet properties and fiber properties in paper." Report of the First Research Fellowship on Pulp and Paper. U. S. Dept. of Agriculture, Forest Products Laboratory, April, 1932. Mimeographed.
4. Carson, F. T., *Paper Trade J.* 99, no. 16:44-52 (Oct. 18, 1934).
5. Baird, Parker K., and Hrubesky, C. E., *Paper Trade J.* 91, no. 4:48-51 (July 24, 1930); *Tech. Assoc. Papers* 13:274-277 (1930).
6. Doughty, R. H., Seborg, C. O., and Baird, P. K., *Paper Trade J.* 94, no. 22:31-33 (June 16, 1932); *Tech. Assoc. Papers* 15:287-289 (1932).
7. Davis, Myrl N., *Paper Trade J.* 96, no. 19:38-40 (May 11, 1933); *Tech. Assoc. Papers* 16:277-279 (1933).
8. Judd, Deane B., *et al.*, *J. Research Natl. Bur. Standards* 19:287-317 (1937).
9. Steele, F. A., *Paper Trade J.* 100, no. 12:37-42 (Mar. 21, 1935).
10. Institute of Paper Chemistry, *Paper Trade J.* 109, no. 4:29-34 (July 27, 1939).
11. Parsons, S. R., *Tech. Assoc. Papers* 25:360-368 (1942).
12. Clark, James d'A., *Paper Trade J.* 115, no. 1:32-39 (July 2, 1942); *Tech. Assoc. Papers* 25:568-575 (1942).
13. Carson, F. T., and Worthington, F. V., *Paper Trade J.* 95, no. 16:34-36 (Oct. 20, 1932).
14. Reese, S. W., and Youtz, M. A., *Paper Trade J.* 100, no. 7:33-34 (Feb. 14, 1935).
15. Beadle, Clayton. "Chapters on Papermaking." Vol. 1, p. 129. London, H. H. Grattan, 1904. 151 p.
16. Lucas, Richard, *Kolloid-Z.* 23:15-22 (1918).
17. Simmonds, F. A., *Paper Trade J.* 97, no. 10:40-42 (Sept. 7, 1933); *Tech. Assoc. Papers* 17:401-403 (1934).
18. Peek, R. L., Jr., and McLean, D. A., *Ind. Eng. Chem., Anal. Ed.* 6:85-90 (1934).
19. Cross, C. F., and Bevan, E. J. "A text-book of papermaking." 5th edition, p. 407. London, E. & F. M. Spon, Ltd., 1920. 527 p.
20. Noll, August, and Bolz, Fritz, *Papier-Fabr.* 32:465-470, 473-477 (1934).
21. Bell, James Horst Brunnemann. "The effects of beating on fibrous cellulose." Doctor's Dissertation, University of Edinburgh. 107 p. Condensed version by Papermakers' Assoc. Gt. Brit. & Ireland (May, 1934). *J. Soc. Chem. Ind.* 52: 109T-116, 119T-130 (1933).
22. Clark, James d'A., *Tech. Assoc. Papers* 25:556-562 (1942).
23. Strachan, James, *Proc. Tech. Sect., Papermakers' Assoc. Gt. Brit. & Ireland* 6:139-167 (1925-26).
24. Sedoff, Arthur, Holmberg, C. V., and Jahn, Edwin C., *Paper Trade J.* 109, no. 26:42-49 (Dec. 28, 1939); *Tech. Assoc. Papers* 22:281-288 (1939).
25. Campbell, W. Boyd, *Pulp Paper Mag. Can.* 31:264-267, 280 (1931).
26. Oviller, Olaf, *Papir-J.* 26:312-314, 316, 318, 320, 322, 324 (1938).
27. Martin, Geoffrey, Bowes, E. A., and Christelow, J. W., *Trans. Ceram. Soc. (England)* 25:51-62 (1925-26).
28. Seborg, C. O., Simmonds, F. A., and Baird, P. K., *Paper Trade J.* 109, no. 8:35-42 (Aug. 24, 1939); *Assoc. Papers* 22:347-354 (1939).
29. Brown, Roger B., *Paper Trade J.* 94, no. 13:35-38 (Mar. 31, 1932); *Tech. Assoc. Papers* 15:133-136 (1932).
30. Buckingham, Stephen A., *Paper Ind.* 20:629-634 (1938-39).
31. Klemm, P., and Schopper, Louis, *Wochbl. Papierfabr.* 39:1005-1006 (1908).
32. Clark, James d'A., *Paper Trade J.* 100, no. 11:36-44 (March 14, 1935); *Tech. Assoc. Papers* 18:158-166 (1935).
33. Clark, James d'A., *Paper Trade J.*, 104 no. 8:146-148 (Feb. 25, 1937); *Tech. Assoc. Papers* 20:187-189 (1937).
34. Doughty, R. H., *Paper Trade J.* 95, no. 10:31-38 (Sept. 8, 1932); *Tech. Assoc. Papers* 16:460-467 (1933).
35. Strachan, James, *Proc. Tech. Sect., Papermakers' Assoc. Gt. Brit. & Ireland* 13:61-81 (1932-33); 14:447-451 (1933-34).
36. Campbell, W. Boyd. "The cellulose-water relationship in papermaking." Canada Dept. Interior, Forest Service, Bulletin 84. Ottawa, F. A. Aland, 1933. 52 p.
37. Dixson, Henry Philip Jr., *Paper Trade J.* 111, no. 3:29-36 (July 18, 1940); *Tech. Assoc. Papers* 23:192-199 (1940).
38. Harrison, H. Ainsworth, *Ind. Eng. Chem.* 26:458-461 (1934).
39. Clark, James d'A., *Paper Trade J.* 110, no. 9:29-32 (Feb. 29, 1940).
40. Reed, Robert W., *Paper Trade J.* 114, no. 25:23-29 (June 18, 1942); *Tech. Assoc. Papers* 25:504-510 (1942).
41. Morris, W. S., and Montigny, R. de, *Pulp Paper Mag. Can.* 41, no. 2:107-112 (Feb., 1940).

Dispersion of Pigments and Fillers for Microscopical Examination

By Lewis B. Miller[1]

Abstract

In the microscopic examination of pigments, fillers, and other finely divided powders used in the manufacture of paper products, difficulty is frequently encountered in effecting a uniform and satisfactory dispersion of the powders so that particle size and shape and their variations may be readily determined under the microscope. A new and simplified method for the preparation of slides of such materials has been developed by which a uniform and well distributed dispersion of the powders may be obtained. Temporary slides may be prepared rapidly, and these may be converted to permanent slides readily and with little additional labor.

The method has been found satisfactory for preparing slides of a number of inorganic powders for the quantitative determination of particle size.

In examining powdered materials consisting of relatively coarse and of very finely divided particles under the microscope, it frequently has been noted that the fine particles cling to the coarser particles, thus giving an erroneous impression of the distribution of particle size and preventing a satisfactory microscopical examination from being made. The present method, first described in a recent article *(1)* and presented more fully here, is the most satisfactory method which has been tried by the writer for investigating such powders, and it has been found satisfactory for separating fine and coarse particles from each other so that correct observations may be made upon such particles by microscopical means.

Dispersion Medium

The dispersion medium, first developed and most extensively used, consists of the following formula:

82	grams amyl acetate
6	grams diethyl ether
4	grams absolute alcohol
1.94	grams parlodion

In use this formula evaporates rapidly and is satisfactory for most powders whose individual particles are dense and of considerable structural strength. For powders in which the particles are fragile and which must be handled more cautiously, a solvent mixture which evaporates more slowly appears to possess some advantages. A modification of the above formula consists of the following:

80	grams amyl acetate
4	grams diethyl ether
6	grams absolute ethyl alcohol
2	grams bytyl alcohol
1.94	grams parlodion

The solvents should be of high purity. The parlodion (a purified pyroxylin) may be obtained in flake form from several laboratory supply houses. The parlodion dissolves slowly in the mixed solvents, and it is usually necessary to permit the mixtures to stand for a number of days with occasional agitation before solution is complete. Parlodion in the form of fine, thin flakes dissolves more readily than when obtained in the form of coarse flakes.

Procedure

Before preparing a slide, the powder to be examined should be thoroughly dried at a temperature of 220° F. or higher. If the powder is affected by this temperature it should be dried as thoroughly as its properties permit. After cooling, a very small quantity of the dried powder is removed from the container, preferably upon a flattened platinum wire or other small implement and placed upon a clean dry glass slide.

NOTE: Undried powders are ordinarily readily examined by the same technique described for dried powders. Dried powders, however, appear to be wetted more readily by the parlodion solution than are undried powders and the microscopical details of dried powders seem to be more clear and distinct.

One or two drops of the parlodion solution are then quickly placed directly *upon* the powder on the slide by a medicine dropper, and the powder is then well dispersed in the solution by rubbing with a small spatula. By tilting the slide and by the use of the spatula the dispersion is then brought to one corner of the slide. A single drop (never more than one drop) of the dispersion is then caused to fall upon the surface of a beaker or pan of water. The dispersion in parlodion spreads instantly over the surface of the water in a thin film. The film must be allowed to stand for one or two minutes in order to permit solvents to evaporate and to permit the film to harden. A change in appearance of the film from shiny to flattish accompanies hardening.

A portion of the film is then selected for examination and the adjacent section of film is cut away and removed by a clean spatula or knife. A clean glass slide is submerged where the film has been removed and brought to a horizontal position under the selected portion of film. The slide is then raised slowly until just clear of the water, care being taken that the film which is now clinging to the slide does not slip over the surface of the slide. The adjacent portions of film are then removed by running the blade of a sharp knife along the edge of the slide.

By touching the edge of the slide to a paper towel or blotter while very slightly tilting it, most of the water can be withdrawn from the film and slide. In doing this care should be taken that both the glass slide, and the parlodion film touch the blotting material; the water will then be withdrawn from between the film and slide, as well as from their surfaces, and this is important.

If during this phase of the preparation the film becomes wrinkled or displaced on the glass slide it should be discarded and another section of film obtained upon another slide. The slide may then be thoroughly air-dried in a moving current of air or preferably dried in an air bath at not much above

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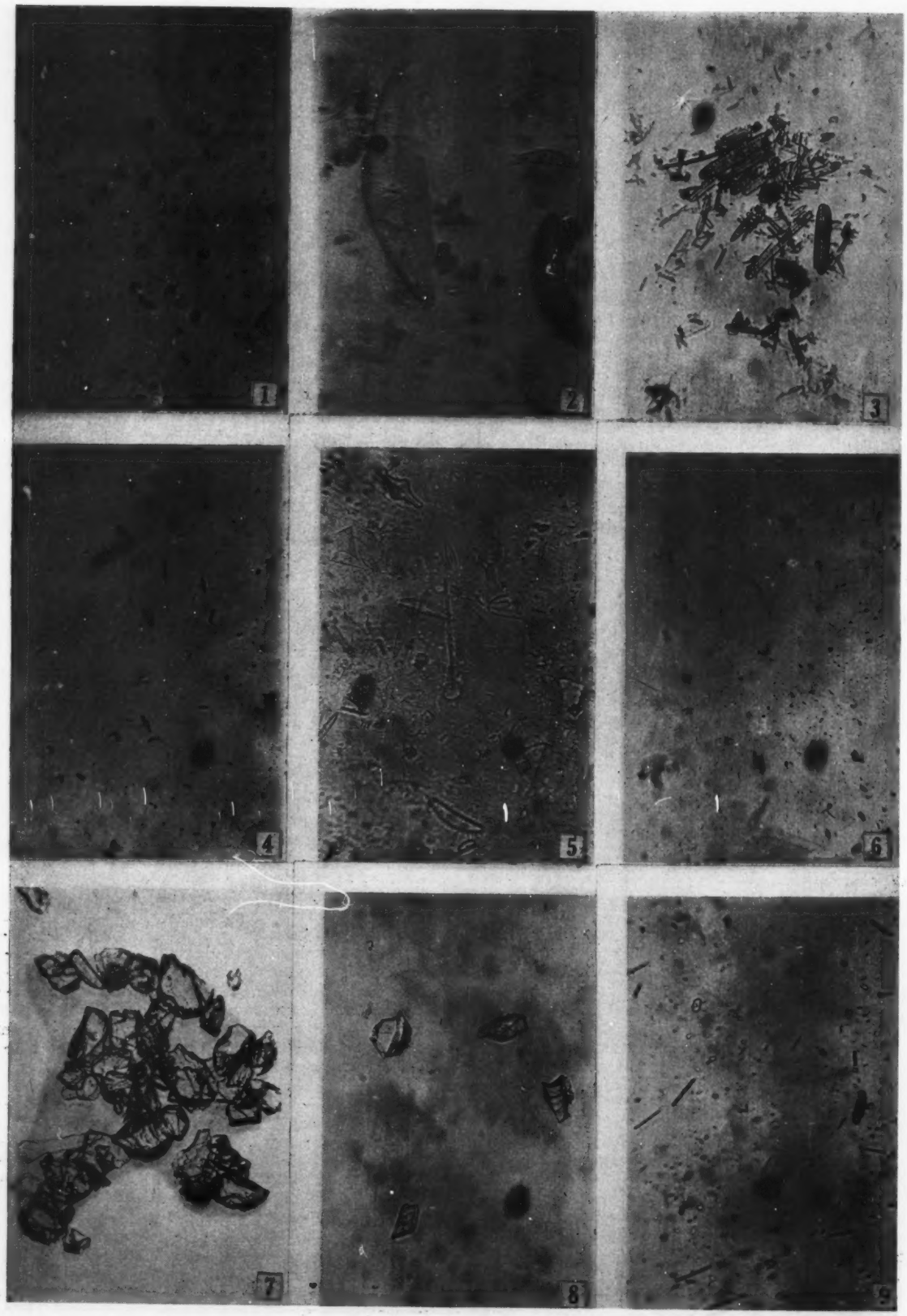


FIGS. 1 TO 9 INCLUSIVE.

130° F. and preferably in a moving current of air. When dry the slide is ready for examination under the microscope.

PREPARATION OF A PERMANENT SLIDE.

Under the conditions of preparation just described the slides will remain satisfactory for at least several hours, and slides thus prepared when stored in a desiccator appeared in good condition even after several days.

From the freshly dried slide, prepared as described above, a permanent slide may quickly be prepared.

A drop of a 60% clarite solution (60% of the synthetic resin, clarite, dissolved in toluene as prepared by the Neville Company, Pittsburgh, Pa.) is placed upon the slide over the portion of the film which it is desired to render permanent. A cover glass (preferably 15 mm. × 15 mm.) is then placed with one edge in contact with the clarite solution and the opposite edge then slowly lowered until the entire cover glass is in contact. By this means air bubbles are avoided under the cover glass. The cover glass should then be pressed down, gently but firmly, by the rubber end of a pencil, care being taken that the parlodion film is not displaced. In a day or two the parlodion will have set, due to evaporation of the toluene, and a permanent slide is obtained. During the setting period of the resin the slide should be maintained in a horizontal position and should be kept in a box or covered container to avoid dust.

Details of Technique

It is desirable in this work to use distilled water, but tap water may be used. In either case the container of water should be allowed to stand, before the parlodion film is formed, until the water has become quiescent and all gas bubbles have escaped.

By the method described here uniform dispersions of very fine materials are readily prepared. Coarser particles of uniform size, as for example particles passing a 100-mesh screen but retained on a 200 mesh, are less easy to disperse. By using smaller quantities of the powder, however, in a drop of the parlodion solution it is possible to obtain a good dispersion. A comparatively larger area of water surface should also be used for forming the film with larger particles. In other words those factors which tend to form a thin film and greater than average dispersion favor the formation of satisfactory films with larger particles. The most difficult powders (with one exception) from which to obtain good dispersions are those made up of a combination of fine and coarse particles. With patience and a little experimentation it is usually possible to determine a satisfactory technique for a new product. Frequently, a tendency on the part of the particles to clump may be counteracted by blowing gently on the film as it is first formed.

Fragile particles, such as the siliceous skeletons of diatoms found in diatomaceous earth, require special care in handling. In general those formulas for the dispersion medium which evaporate more slowly, thus giving the operator more time in which to prepare the dispersion, favor the production of good dispersions. In the preparation of slides of diatomaceous earth, the powder cannot be worked into the dispersion medium by the usual method of rubbing-up with a spatula since this would pulverize the individual particles. Gently agitating the powder in the dispersion medium by means of a fine needle set in a handle seems to distribute the particles well in the dispersion medium while effecting a minimum destruction of the individual particles.

Discussion of Powders Examined

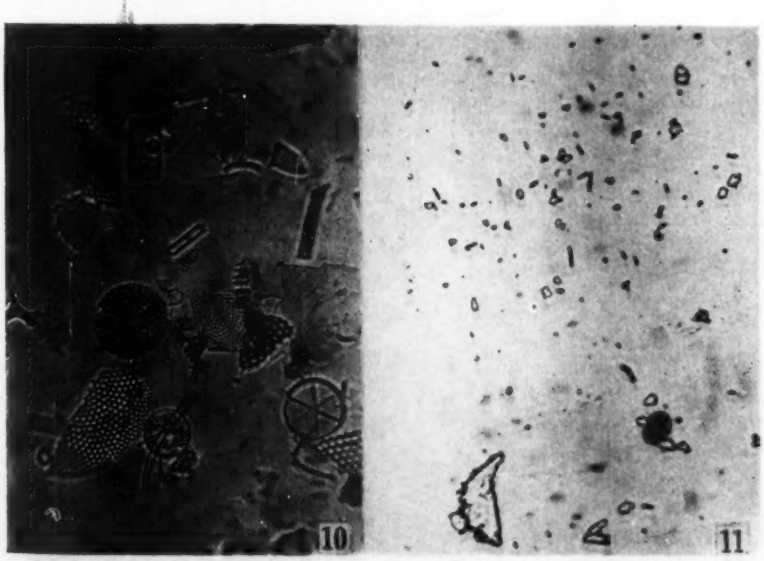
The present method of slide formation has been applied to a large number of mineral and inorganic powders and to a few organic powders insoluble in the solvents used. Each of these behaves somewhat differently. Ordinarily a little experimentation is required to determine the best technique for dispersing a given powder. Occasionally it is necessary to modify the dispersion medium in order to obtain satisfactory results.

The degree of separation of the solid particles may be controlled either by reducing the proportion of the powder in a drop of dispersion medium or by increasing the area of the water surface upon which the film is formed.

Film thickness may be increased by reducing the water area, or, more readily, by varying the amount of solvent evaporated during the dispersion of the powder in the parlodion solution. The more solvent that evaporates, the thicker will be the resultant film.

In the accompanying photomicrographs some of the principles of slide formation discussed in the preceding paragraphs are demonstrated. Many of the filler materials used in papers were investigated and found to behave quite similarly to the two or three pulverized materials shown here in the photomicrographs.

Figure 1 is a photomicrograph of a sample of diatomaceous earth. It indicates what usually



FIGS. 10 AND 11.

happens in a sample containing comparatively coarse particles together with very fine particles when a slide is made by one of the usual methods of dispersion. Although special effort was made to obtain a good dispersion, close observation will indicate fine particles adhering to the surfaces of larger diatoms. (Magnification 100 ×).

Figure 2 demonstrates the same fact as was indicated in Fig. 1 but with photomicrograph taken at a higher magnification (1000 ×).

Figure 3 is a photomicrograph of a coarse fraction of diatomaceous earth from which most of the fines have been separated by settlement in water. This shows what frequently happens with one of the usual methods of slide formation. The particles tend to collect together so that an adequate observation regarding the particle sizes and particle size distribution is impossible to obtain (magnification 100 ×).

Figure 4 is a photomicrograph of a moderately coarse fraction of diatomaceous earth containing some fine material dispersed by the film method. A good dispersion of particles is obtained (magnification 100 ×).

Figure 5 is a heavy dispersion of diatomaceous earth containing both fine and coarse particles made by the film method. Although the particles are close to each other, because of the heavy distribution, it will be noted that the fine and coarse particles are reasonably well separated and that the particles, as a whole, are uniformly distributed (magnification 450 ×).

Figure 6 is a photomicrograph of a water separated fraction of diatomaceous earth in a slide made by the film method. The particles are much finer than those shown in Figure 3. Note the even distribution and good separation of individual particles (magnification 100 ×).

Figure 7 shows particles of fluorspar passing a 100-mesh screen but retained on a 200 mesh. With a slide prepared by one of the usual methods there is a tendency for the particles to collect together and to offer poor distribution (magnification 100 ×).

Figure 8 is fluorspar from the same sample as was used for Fig. 7. Slide prepared by the film method (magnification 100 ×).

Figure 9 is a sample of diatomaceous earth similar to that shown in Fig. 6 but containing spicular diatoms, prepared by the film method (magnification 450 ×).

Figure 10 is a very coarse fraction of diatomaceous earth in a slide prepared by the film method. Note even, although very heavy, distribution of particles (magnification 450 ×).

Figure 11 is finely pulverized muscovite containing a few coarse particles. Note even distribution (magnification 450 ×).

Literature Cited

1. Miller, Lewis B. "Dispersion of Powders for Microscopical Examination." *Trans. Am. Microscopical Soc.* 61:302-5 (1942).

TAPPI Notes

The Delaware Valley Section of the Technical Association of the Pulp and Paper Industry will meet at the Engineers Club, Philadelphia, Pa., on Friday, February 5, 1943. R. T. Barnes of the International Nickel Company, will talk on "Modern Materials for Papermaking Machinery."

Allen Abrams, vice president of the Marathon Paper Mills, is now Deputy Director of the Research and Development Division of the Office of Strategic Services, Temp. Bldg. One, Washington, D. C.

John J. McDonald, formerly of the Brown Company, is now a Captain in the C. W. S., Edgewood Arsenal, Md.

William R. Maull of the Mead Corporation, is a Lt. Col. in the C. W. S. at Edgewood.

James H. Fritz, formerly of the National Oil Products Company, is also an officer in the C. W. S. at Edgewood.

Walter Savell, formerly of the Mathieson Alkali Works, is now a Lt. Col. in the Chemical Warfare Service. He also has three sons in the armed services.

E. P. McGinn, formerly of the Curtis Publishing Company, is now Chief Chemist of the National Oil Products Company, Harrison, N. J.

E. G. Goodell, vice president of the Stevens Point Pulp and Paper Company, is successfully recovering from a serious operation.

Chemical Engineering Plant Design

The second edition of Chemical Engineering Plant Design by Frank C. Vilbrant of the Virginia Polytechnic Institute, has just been published by the McGraw-Hill Book Company. (452 pages, 6 x 9, 133 tables, 67 illustrations.) This book is especially well adapted to the needs of the professional engineer who has had no course in design, and of other technical men and executives who require a comprehensive explanation of the applications of chemical engineering principles to plant design. It covers the entire project from the test tube to the commercial unit.

Among the subjects covered are foundations, drainage, piping, pumps, building, power transmission, selection of equipment, preconstruction cost accounting and plant location. Although this book does not relate specifically to pulp and paper mills, it is an excellent fundamental book for chemical and mechanical engineers engaged in this industry.

Copies may be obtained from the Book Department of the Technical Association of the Pulp and Paper Industry, 122 East 42nd street, New York, N. Y., at five dollars per copy.

G. A. Harshbarger Promoted to Major

Glenn A. Harshbarger, formerly of 1316 Thompson avenue, Glendale, Cal., has been promoted from Captain to Major, in the Quartermaster Corps, it was announced this week by Brigadier General James A. Service Area Command. Major Harshbarger is Ex-Mollison, Commanding General of the Second Air ecutive Office of the Quartermaster Section of the Command, which directs the training and supply of all Army Air Force service and maintenance groups in the six-state area of Arizona, New Mexico, Texas, Arkansas, Oklahoma and Louisiana.

In civilian life Major Harshbarger was a member of the Officers' Reserve Corps and entered active service as a 1st Lieutenant on May 15, 1941, being assigned to the Army Air Forces at Minter Field, Bakersfield, Cal. Before being called into active duty he was in charge of the Los Angeles office of the Frank E. Witte Company, California sales representative for the Baker Industrial Truck Div., of the Baker-Raulang Company, Cleveland, Ohio, manufacturers of industrial trucks, tractors, and cranes. His office was located at 1855 Industrial street, Los Angeles. He was promoted to Captain on February 1.

IMPORTS OF PAPER

NEW YORK IMPORTS

WEEK ENDING JANUARY 2, 1943

SUMMARY

Newsprint ..... 3,717 rolls

NEWSPRINT

World Telegram, ——, ——, 755 rolls.
Evening Journal, ——, ——, 1001 rolls.
Daily Mirror, ——, ——, 2 rolls.
Bronx Home News, ——, ——, 433 rolls.
Evening Journal, ——, ——, 1526 rolls.

WOOD PULP

——, ——, ——, 213 bls. unbleached sulphite.

Krebs Pigment Corp. Dissolved

WILMINGTON, Del., December 31, 1942—Effective today, the Krebs Pigment and Color Corporation, which has been a wholly owned subsidiary of E. I. duPont de Nemours & Co., for the past eight years, is dissolved. Its functions will be carried on by the Pigments Department of the duPont Company.

This change of name involves no change in the personnel of the Sales, Manufacturing or Research Divisions, nor will there be any change in the management or policies.

An announcement stated that the Pigments Department of E. I. duPont de Nemours & Co., which is the new name for the Krebs Pigment and Color Corporation, will continue to supply white zinc sulfide and titanium pigments and chemical dry colors to manufacturers of paint, linoleum, ink, leather, coated fabrics, paper, soap, rubber, rayon, shadecloth, ceramics and other products. Research activities will continue, as heretofore, to be directed toward the development of new and improved white pigments and dry colors.

The white pigments offered by the newly named Pigments Department comprise complete lines of lithopone, titanium dioxide, and extended titanium pigments, together with chemical dry colors including chrome yellows, chrome greens, iron blues, organic lakes and toners.

J. B. Eastman to Speak at Luncheon

E. W. Tinker, secretary, has sent out the following notice which is self-explanatory:—"As has been announced in the trade press, the 66th annual meeting of the American Paper and Pulp Association will be held at the Waldorf-Astoria, New York, N. Y., during the week beginning February 15, 1943.

"Decision to hold this meeting was based upon the fact that these meetings have become essentially business meetings of the industry and at times such as these there is no doubt that at least 80 per cent of the business will pertain to the maximum contribution the industry can make toward winning the war. It is presumed that each company will give consideration to traveling conditions in deciding upon attendance, but it is hoped that the business to be accomplished during the week will be borne in mind in making these decisions. In case the Office of Defense Transportation issues prohibitive orders that would preclude holding the meeting, you will be promptly informed.

"I am happy to tell you that Joseph B. Eastman, director of the Office of Defense Transportation, has accepted our invitation to address the Luncheon of the American Paper and Pulp Association on February 15 at 1:00 P.M."

Wentworth Brown Appointed Manager

H. P. Carruth, vice president in charge of operations, announces the appointment of Wentworth Brown as manager of production of Brown Company, Berlin, N. H. He replaces John D. McCrystle, who has resigned from the company.

Mr. Brown, who has been manager of production for Brown Corporation, was recently elected vice president of this wholly owned Canadian subsidiary, and will continue to hold these positions in addition to his new duties.

Mr. Brown is the son of O. B. Brown, a director of Brown Company, and is a grandson of W. W. Brown, who founded the company in 1852. After graduating from Andover Academy and Williams College, Mr. Brown joined the Brown Company in 1929 where he was employed in the Burgess Mill and the Research Department. In 1931 he went to La Tuque, Canada, to take charge of production at the Brown Corporation mills.

WENTWORTH BROWN

Mr. Brown is active in the technical section of the Canadian Pulp and Paper Association and the American Paper and Pulp Association. In addition to these interests, he is a vice president of St. Maurice Power Corporation in which Brown Corporation holds a half interest.

Glatfelter Co. Makes Christmas Gifts

SPRING GROVE, Pa., January 4, 1943—A liberal Christmas distribution was made to all employees of the P. H. Glatfelter Company, paper manufacturer, as has been their custom for a number of years. The company sent money orders to the 44 members of the company serving in the armed forces of the United States. Along with the orders went a special greeting from P. H. Glatfelter, president of the company. These boys also were notified of the deposit of one $25 war bond made out in their name and to be held in safe-keeping for them until the end of the war.

New York Paper and Pulp Market Review

Paper Demand Continues High With Usual Holiday Decline Reported—Bleached Sulphite and Sulphate Pulps Scarce With Less Groundwood Available—Waste Paper Less Active and Prices Firm.

Office of the PAPER TRADE JOURNAL
Wednesday, January 6, 1943

The wholesale paper market reflects the usual seasonal lull over the holidays and the year-end inventory period, according to reports received from many manufacturers' representatives, jobbers, and general paper merchants this week.

The index of general business activity for the week ended December 26 rose to 136.6%, from 135.5% for the preceding week, compare with 137.1% for the corresponding week last year. Paper board production was 1.1% higher.

Paper production for the holiday week ended December 26 was 72.0%, compared with 76.0% for 79.3% for 1941, with 61.4% for 1940, with 76.2% for 1939, and with 62.8% for the corresponding week for 1938.

Paper board production for the week ended December 26 was 72.0%, compared with 76.0% for 1941, with 48.0% for 1940, with 46.0% for 1939, and with 35.0% for the corresponding week for 1938.

The WPB in explanation of its Limitation Orders L-240 and L-244, effective January 1, estimates that it will reduce the consumption of print paper used in the manufacture of newspapers and magazines to approximately 10% below the December level. The tonnage a newspaper publisher may use, for example, is 100% of the amount used by him to produce his net paid circulation in 1941, plus a 3% spoilage allowance. This apparently indicates that papers and magazines which have recently increased their circulations, will be the concerns most adversely affected.

The WPB further explains that estimates of pulpwood for U. S. and Canadian consumption this year, would be 25% less than in 1942. Factors cited for the curtailment were the expanding smokeless powder program; the demands of the important chemical industries; the increasing need for paper containers growing directly out of the war effort; the loss of burlap, formerly imported from India, and manila from the Philippines, and the limitation on the use of steel drums.

The WPB points out that these shortages here put a heavy burden on the supplies of heavy duty paper bags for war shipment and essential civilian use. Production of multi-wall paper sacks is expected to rise from 300,000 tons in 1942, to 600,000 tons in 1943.

Wood Pulp

Supplies of bleached sulphite and sulphate pulp are scarce. Good grades of unbleached sulphite are more difficult to obtain, and less groundwood pulp is currently reported available. Northern kraft is steadily becoming tighter. The supply situation in unbleached southern kraft is comparatively favorable at this date.

The WPB states in its announcement reducing print papers, that the government has made heavy commitments of pulp in its lend-lease program to England and Australia, and sizable tonnages will go to South America under the board of Economic Welfare's program.

Rags

Mill buying of new cotton cuttings is reported less active, largely attributed to the year-end inventory period. Supplies are reported limited and prices are firm.

Old Rope and Bagging

Demand for old No. 1 manila rope is reported steady. No important change in the old rope market has been reported this week.

Demand for scrap bagging is quiet, with mill purchasing reported as light. Prices are unchanged.

Old Waste Paper

The old waste paper market continues to reflect a strong tone, despite the usual year-end lull due to the holidays. Prices are firm and demand is expected in several quarters to continue higher, with some upward revision in prices from the current level.

Twine

A strong demand for many grades of cordage and twine is generally expected to be continued in 1943. Certification for approved uses will be required, it is understood, on all scarce imported fibers. Prices are firm.

A Reagent for Water Softeners

Phosphoric Acid—A new reagent for use with hot process water softeners, is the title of an article appearing in the September, 1942, issue of "Combustion," reprints are available at the Cochrane Corporation, 17th and Allegheny avenue, Philadelphia, Pa.

The paper describes in simple language the use of phosphoric acid as the reagent in single or two-stage water softeners, which takes the place of mono-sodium, di-sodium and tri-sodium phosphate, resulting in better control of the alkalinity at a much lower cost of reagents.

With this method of operation, feed water has been treated and is satisfactory for 1400# boilers, reducing the hardness to approximately ½ ppm.

It represents a step in advance in operation of the hot process softener and produces a water of a hardness so low that all accumulation of sludge in boilers is avoided, and is satisfactory for the most critical operation, and has been tested in boilers operating at 1400# per sq. in.

Comparison of chemical costs are given as well as data showing the effectiveness of this treatment in typical installation.

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TILE CHESTS *Built to your Requirements*

KALAMAZOO tile chests can be built to your exact requirements for stock storage and bleaching. The vitrified glazed tile, made in our own tile plant, is impervious to all ordinary stock fluids and is suitable for storage of liquid alum. The smooth surface is cleaned easily and quickly with hose. Your installation can be designed for adaptation to pump delivery and agitation of any type. Our manufacturing facilities and years of experience with the paper industry are geared for immediate attention to your individual requirements. Write for complete information about prompt delivery and carefully supervised installation.

BUY WAR BONDS

So satisfactory was the first 37-foot Kalamazoo Glazed Tile Chest installed for the Sorg Paper Company, Middleton, Ohio, that they have recently added two more. All are adapted for Shartle Bros. "Agi-Flow."

GLAZED TILE

KALAMAZOO TANK & SILO CO.

KALAMAZOO, MICHIGAN

WOOD

MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL
Wednesday, January 6, 1943

BLANC FIXE—Prices on blanc fixe are firm and unchanged and conform to prevailing market levels. The pulp is currently quoted at $40 per ton, in barrels, at works; the powder is currently quoted at $60 per ton, f.o.b., works. Demand reported good for the week.

BLEACHING POWDER—Quotations on bleaching powder are firm. Demand reported active for the week. Bleaching powder is currently quoted at $2.50 per 100 pounds, in drums, at works.

CASEIN—Prices on casein are unchanged for the current week. Standard domestic casein, 20-30 mesh, is currently quoted at 19 cents per pound; 80-100 mesh, at 19½ cents per pound. All prices in bags, car lots. Argentina casein, 20-30 mesh, at 9 cents per pound, c.i.f., is nominal. No quotations on French casein.

CAUSTIC SODA—Quotations on caustic soda continue unchanged at prevailing market prices. Demand reported fair. Solid caustic soda is currently quoted at $2.30 per 100 pounds; flake and ground at $2.70 per 100 pounds in drums, car lots, at works.

CHINA CLAY—Prices on china clay are firm and conform to prevailing market levels. Demand reported moderate at this date. Domestic filter clay is currently quoted at from $7.50 to $15 per ton; coating clay at from $12 to $22 per ton, at mines. Imported clay is currently offered at from $13 to $25 per ton, ship side.

CHLORINE—Quotations on chlorine are firm and unchanged. Market strong. Government demand is reported heavy during the current week. Chlorine is currently quoted at $1.75 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—The rosin market is reported firm for the week with lower prices on some grades. "G" gum rosin is currently quoted at $3.42 per 100 pounds, in barrels. Savannah "F" wood rosin is currently quoted at $3.40 per 100 pounds, in barrels, New York. Seventy per cent gum rosin size is quoted at $3.63 per 100 pounds f.o.b., works.

SALT CAKE—Prices on salt cake are firm. Demand moderate for the current week. Domestic salt cake is currently quoted at $15 per ton, in bulk; chrome salt cake at $16 per ton. Restrictions on chrome cake removed. All prices in car lots, f.o.b., shipping point. The quotation of $16 per ton on imported salt cake is nominal.

SODA ASH—Quotations on soda ash are firm and continue to conform to prevailing market levels. Demand reported good for the week. Prices on soda ash in car lots, per 100 pounds, are as follows: in bulk, $0.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—Prices on corn starch are reported unchanged for the current week. Pearl is currently quoted at $3.10 per 100 pounds; powdered starch at $3.20 per 100 pounds. All prices in bags, car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA—Quotations on sulphate of alumina are firm. Demand reported light for the current week. The commercial grades are currently quoted at from $1.15 to $1.25; iron free at from $1.75 to $1.85 per 100 pounds. All prices in bags, car lots, f.o.b., works.

SULPHUR—Prices on sulphur are firm and conform to prevailing market levels. Annual contracts are currently quoted at $16 per long ton, f.o.b., mines. Spot and nearby car lots are quoted at $18 per ton.

TALC—Quotations on talc are firm and continue unchanged at prevailing market prices. Domestic talc is currently quoted at from $15 to $21 per ton, at mines. No quotations on imported talc.

MARKET QUOTATIONS

All market quotations, excepting those otherwise designated as official OPA maximum prices, are based on the manufacturers' price level as of October 1-15, 1941; maximum wholesale prices are based on the merchants' maximum prices for stipulated quantities at a quoted price to all customers of a like class, as shown by the merchant's sales records of goods delivered during March, 1942. A merchant's price list in effect in March 1942, showing quotations of actual shipments, will establish the current maximum prices.

Paper

(Delivered New York

News, per ton—			
Roll, contract	$50.00	@	—
Sheets	58.00	"	—
Kraft—per cwt.—Carload Quantities Zone A, f.o.b. Mill			
Superstandard Wrapping	$5.00	@	—
No. 1 Wrapping	4.75	"	—
Standard Wrapping	4.50	"	—
Standard Bag	4.125	"	—
Tissues— Per Ream—Carlots			
White No. 1	1.12½	"	—
White No. 1 M. G.	1.05	"	—
White No. 1½	1.00	"	—
White No. 2	1.00	"	—
Anti-Tarnish M. G.	.95	"	—
Colored	—	"	—
Kraft	.95	"	—
Manila	.90	"	—
Unbl. Toilet, 1 M.	4.16	"	—
Bleached Toilet	5.70	"	—
Paper Towels Per Case			
Unbleached, Jr.	2.35	"	—
Bleached, Jr.	2.65	"	—
Manila per cwt.—C			
No. 1 Jute	11.25	@	—
No. 1 Manila Wrapping, 35 lb.	5.50	"	5.75
No. 2 Manila Wrapping, 35 lb.	5.25	"	5.50
Boards, per ton—			
News	*48.00	@	—
Chip	*45.00	"	—
Sgl. Mla. Lt. Chip	*60.00	"	—
White Pat. Coated	*75.00	"	—
Kraft Liners 50 lb.	*60.00	"	—
Binders Boards	84.00	"	116.00

* OPA Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5.; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following are representative jobbers' resale prices:

Rag Content Bonds and Ledgers
White, Assorted Items
Delivered in Zone 1

	Bonds	Ledgers
100% Rag Extra No. 1	$39.10@$46.00	$40.25@$47.25
100% Rag	32.20 " 37.75	33.35 " 39.25
75% Rag	.... "	29.90 " 35.00
75% Rag	23.00 " 27.00	24.15 " 28.25
50% Rag	... "	22.80 " 27.75
50% Rag	18.70 " 22.75	19.90 " 24.25
25% Rag	16.40 " 20.00	17.55 " 21.50

Colors at $1.00 cwt. extra.

Sulphate Bonds and Ledgers—
White, Assorted Items.
Delivered in Zone 1:

	Bonds	Ledgers
No. 1	$10.55@$12.75	$11.70@$14.25
No. 2	9.65 " 11.75	10.80 " 13.25
No. 3	9.20 " 11.25	10.35 " 12.50
No. 4	8.90 " 10.75	10.05 " 12.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers
White Coated Papers
Delivered in Zone 1

No. 1 Glossy Coated	$13.65	@ $13.[illegible]
No. 2 Glossy Coated	12.40	" 14.0[illegible]
No. 3 Glossy Coated	11.60	" 13.2[illegible]
No. 4 Glossy Coated	11.15	" 12.7[illegible]
No. 1 Antique (watermarked)	10.25	" 11.7[illegible]
No. 2 Offset	9.60	" 11.0[illegible]
A Grade E. F.	9.35	" 10.7[illegible]
A Grade S. & S. C.	9.60	" 11.0[illegible]
B Grade E. F.	8.85	" 10.2[illegible]
B Grade S. & S. C.	9.10	" 10.5[illegible]
C Grade E. F.	8.55	" 9.7[illegible]
C Grade S. & S. C.	8.80	" 10.0[illegible]
D Grade E. F.	8.25	" 9.5[illegible]
D Grade S. & S. C.	8.50	" 9.7[illegible]

Ivory & India at $.50 cwt. extra.

Wood Pulp

OPA Maximum Prices and Canadian Manufacturers Prices, Less Freight to Destination.

Bl. Softwood Sulphite	$76.0[illegible]
Unbl. Softwood Sulphite	64.00 @ 66.0[illegible]
Bl. Hardwood Sulphite	73.5[illegible]
Unbl. Hardwood Sulphite	63.5[illegible]
Bl. Mitscherlich	81.0[illegible]
Unbl. Mitscherlich	72.0[illegible]
N. Bleached Sulphate	86.0[illegible]
S. Bleached Sulphate	79.0[illegible]
N. Semi-Bleached Sulphate	62.0[illegible]
S. Semi-Bleached Sulphate	75.0[illegible]
N. Unbl. Sulphate	73.0[illegible]
S. Unbl. Sulphate	63.5[illegible]
Bl. Soda	66.0[illegible]
Unbl. Soda	62.0[illegible]
Groundwood	46.0[illegible]

Transportation Allowances

Applying to Producers of Wet Wood Pulp.

	Below 50% Air Dry Weight
Northeast	$13.5[illegible]
Lake Central	13.5[illegible]
Southern	16.0[illegible]
West Coast (in area)	10.5[illegible]
West Coast (out area)	16.50

	50% 80% Air Dry Weight
Northeast	$11.5[illegible]
Lake Central	11.5[illegible]
Southern	14.00
West Coast (in area)	9.50
West Coast (out area)	15.50

Applying to Producers of Dry Wood Pulp.

	Above 80% Air Dry Weight
Northeast	$8.50
Lake Central	8.5[illegible]
Southern	11.00
West Coast (in area)	7.50
West Coast (out area)	13.50

Should freight charges actually exceed these allowances, the difference may be added to the maximum prices.

Domestic Rags

New Rags
(Prices to Mill f. o. b. N. Y.

Shirt Cuttings—		
New White, No. 1	8.00	@ 8.2[illegible]
Silesias No. 1	4.50	" 4.7[illegible]
New Unbleached	8.00	" 8.2[illegible]
Blue Overall	5.75	" 6.00
Fancy	3.00	" 3.2[illegible]
Washables	2.50	" 2.7[illegible]
Mixed Khaki Cuttings	2.50	" 2.7[illegible]
O. D. Khaki Cuttings	3.00	" 3.1[illegible]

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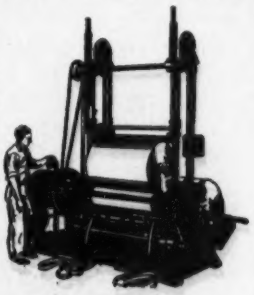

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Paperboard boosts clipper freight

Things are happening in the application of paper to new war uses. For instance, in a recent trans-Pacific airline innovation, bulky wooden packing cases were replaced by weight and space reducing paperboard. Actual checkups show a weight saving of about 500 pounds per trip—a considerable boost to vital wartime cargo shipments.

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help to meet these vastly heightened paper needs, by maintaining their standards of uniformity and purity. HOOKER technicians will be glad to cooperate with yours in the solution of any problem within the HOOKER sphere.

3352

Old Rags

White, No. 1—			
Repacked	*3.80	"	—
Miscellaneous	*3.20	"	—
White, No. 2—			
Repacked	*2.90	"	—
Miscellaneous	*2.65	"	—
Third and Blues—			
Repacked	*2.20	"	—
Miscellaneous	*1.80	"	—
Roofing Rags			
No. 1	*1.55	"	—
No. 2	*1.45	"	—
No. 3 (bagging)	*1.35	"	—
No. 4	*1.35	"	—
No. 5A	*1.35	"	—
Old Manila Rope	5.75	"	—

OPA Maximum Prices.

Foreign Rags

All prices nominal
New Rags

New Dark Cuttings	2.25	●	2.40
New Mixed Cuttings	2.00	"	2.20
New Light Silesias	5.50	"	5.75
Light Flannelettes	5.50	"	5.75
New White Cuttings	7.00	"	7.50
New Light Oxfords	4.00	"	4.50
New Light Prints	3.00	"	3.25

Old Rags

No. 1 White Linens	7.50	"	8.50
No. 2 White Linens	6.50	"	7.50
No. 3 White Linens	4.50	"	—
No. 4 White Linens	2.25	"	3.25
No. 1 White Cotton	4.25	"	4.75
No. 2 White Cotton	3.25	"	3.75
No. 3 White Cotton	2.50	"	3.00
No. 4 White Cotton	1.90	"	2.20
Extra Light Prints	2.00	"	2.40
Ord. Light Prints	1.75	"	2.15
Med. Light Prints	1.55	"	1.95
Dutch Blue Cottons	2.25	"	2.50
French Blue Linens	3.00	"	—
Checks and Blues	2.00	"	—
Linsey Garments	1.90	"	2.00
Dark Cottons	1.50	"	1.60
Old Shopperies	1.30	"	1.45
New Shopperies	1.45	"	1.50
French Blues	2.25	"	2.50

BAGGING

Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	4.00	●	4.25
Wool Tares, light	4.25	"	4.50
Wool Tares heavy	4.50	"	4.75
Bright Bagging	4.50	"	4.85
Manila Rope—			
Foreign	—	"	—
Domestic	*5.75	"	—
Jute Threads	4.25	"	4.75
Sisal Strings	3.25	"	3.75
Mixed Strings	1.10	"	1.20

*OPA Maximum Price

Old Waste Papers

(F. o. b. New York)
OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	●	—
No. 1 Hard White Envelope Cuts	3.12½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, one cut	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Mixed Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
Mixed Groundwood Colored Shavings	.90	"	—
Overissue Magazines	1.67½	"	—
No. 1 Heavy Books & Magazines	1.57½	"	—
Mixed Books	.85	"	—
No. 1 White Ledger	2.17½	"	—
No. 2 Mixed Ledger, colored	1.87½	"	—
New Manila Envelope Cuttings, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
Extra Manilas	1.85	"	—
Mixed Kraft, Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
Triple Sorted, No. 1 Brown Soft Kraft	2.50	"	—
New 100% Kraft Corrugated Cuttings	2.25	"	—
No. 1 Assorted Old Kraft	1.75	"	—
New Jute Corrugated Cuttings	.90	"	—
Old Kraft Corrugated Containers	1.50	"	—
Box Board Cuttings	.72½	"	—
White Blank News	1.65	"	—
Overissue News	.85	"	—
No. 1 News	.75	"	—
No. 2 Mixed Paper	.70	"	—
Old Corrugated Containers	.82½	"	—
Mill Wrappers	.85	"	—

Twines

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.21	●	—
White Hemp	.21	"	—
Fine Polished—			
Fine India	.26	"	—
Unpolished—			
Box	.17½	"	—
Paper Makers	.17	"	—
Tube Rope	.19	"	—
Wall Paper	.20½	"	—
Wrapping	.23	"	—
Soft Fiber Rope	.19	"	—
Cotton	.25	"	—

(Hard Fiber)

Medium Java	.18	"	—
Mex. Sisal	.16	"	—
Manila	—	"	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White No. 1	.07½	●	.07½
New White No. 2	.04½	"	.05
Light Silesias	.04½	"	.04½
Silesias, No. 1	.04	"	.04½
Black Silesias, soft	.03½	"	.04
New Unbleached	.07½	"	.07½
Washable Prints	.03½	"	.03½
Washable No. 1	.02	"	.02½
Blue Overall	.04½	"	.05½
Cottons—According to grades—			
Washable shredding	—	"	.01½
Fancy Percales	.03½	"	.03½
New Black Soft	.02½	"	.03
New Dark Seconds	1.75	"	2.00
Khaki Cuttings—			
No. 1 O. D.	.03	"	.03½
No. 2 Mixed	.02½	"	.02½
Corduroy	.01½	"	.02½
New Canvas	.04½	"	.05½
New Black Mixed	—	"	.02½

Domestic Rags (Old)

White No. 1 — Repacked	3.80	"	—
White No. 2 — Repacked	2.90	"	—
Miscellaneous No. 1	3.20	"	—
Miscellaneous No. 2	2.65	"	—
Thirds and Blues—			
Miscellaneous	1.80	"	—
Repacked	2.20	"	—
Black Stockings— (Export)	Nominal		
Roofing Stock—			
Foreign No. 1	Nominal		
Domestic No. 1	1.55	"	—
Domestic No. 2	1.45	"	—
Roofing Bagging	1.35	"	—
Old Manila Rope	5.75	"	—

Bagging

(F. o. b. Phila.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	3.00	"	3.50
Sisal Rope	3.75	"	—
Mixed Rope	.75	"	1.00
Scrap—			
No. 1	3.25	"	3.50
No. 2	1.75	"	1.80
Wool Tares, heavy	4.00	"	4.25
No. 1 New Light Burlap	1.90	"	4.00
New Burlap Cuttings	3.75	"	4.00

Old Papers

(F. o. b. Phila.)
OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
Soft White Shavings, one cut	2.87½	"	—
White Blank News	1.65	"	—

BOSTON

Old Papers

(F. o. b. Boston)
OPA Maximum Prices

No. 1 Hard White Shavings, unruled	2.87½	●	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
No. 1 Heavy Books & Magazines	1.57	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Overissue News	.85	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old Corrugated Containers	1.00	"	—
Jute Corrugated Cuttings	1.07½	"	—

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	(nominal)		
Domestic	3.50	●	4.00
Sisal Rope	4.50	"	4.75
Mixed Rope	1.35	"	1.50
Transmission Rope—			
Foreign	(nominal)		
Domestic	3.00	"	3.50
Manila Rope—			
Foreign	(nominal)		
Domestic	5.75	"	—
Soft Jute Rope	4.75	"	5.25
Jute Carpet Threads	3.25	"	3.50
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	(nominal)		
Domestic	3.50	"	3.75
Scrap Sisal	4.50	"	4.75
Scrap Sisal for Shredding	—	"	.04½
Wool Tares—			
Foreign	(nominal)		

Waste Paper

(F. o. b. Chicago)
OPA Maximum Prices

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled	2.50	"	—
No. 1 Soft White Shavings	2.50	"	—
No. 1 White Ledger	2.17½	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 White Ledger	2.17½	"	—
No. 2 Ledger, colored	1.87½	"	—
No. 1 Heavy Books & Magazines	1.57	"	—
Overissue Magazines	1.67½	"	—
New Manila Envelope Cuttings	2.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Box Board Cuttings	.72½	"	—
Jute Corrugated Cuttings	.90	"	—
Overissue News	.85	"	—
No. 1 News	1.00	"	—

Domestic	5.00	"	5.75
Aust. Wool Pouches	5.10	"	5.25
New Burlap Cuttings	5.00	"	5.25
Heavy Baling Bagging	4.25	"	4.75
Paper Mill Bagging	2.75	"	3.00
No. 2 Bagging	1.35	"	—

*OPA Maximum Price

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.04½	●	.04¾
Fancy Percales	.04¼	"	.05
New White No. 1	.06¾	"	.06½
New Light Flannelettes	.05½	"	.06
Canton Flannels, Bleached	.06	"	.06½
Underwear Cutters, Bleached	.06	"	.06½
Underwear Cutters, Unbleached	.05¾	"	.06
Silesias No. 1	.06	"	.06¼
New Black Silesias	.03	"	.03½
Red Cotton Cuttings	.03¼	"	.04
Soft Unbleached	.06½	"	.06¾
Blue Cheviots	.05¾	"	.06
Fancy	.02¾	"	—
Washable	.02¾	"	—
Khaki Cuttings	.02¾	"	.03
O. D. Khaki	.03¼	"	.03¾
Corduroy	.03¾	"	.03¾
New Canvas	.06¼	"	.06¾
B. V. D. Cuttings	.06¾	"	.06¾

Domestic Rags (Old)

F. o. b. Boston

White No. 1—			
Repacked	3.80	●	—
Miscellaneous	3.20	"	—
White No. 2—			
Miscellaneous	2.65	"	—
Thirds and Blues, Repacked	2.20	"	—
Old Blue Overalls	2.25	"	4.00
Thirds and Blues, Repacked	2.20	"	—
Miscellaneous	1.80	"	—
Black Stockings	3.50	"	4.00
Roofing Stock—			
No. 1	1.55	"	—
No. 2	1.45	"	—
No. 3	1.35	"	—
No. 4	1.35	"	—
No. 5, Quality A	1.35	"	—
Quality B	1.20	"	—
Quality C	.95	"	—
Old Manila Rope	5.75	"	—

*OPA Maximum Prices

Foreign Rags

F. o. b. Boston

Canvas	(nominal)		
Dark Cottons	(nominal)		
Dutch Blues	(nominal)		
New Checks and Blues	(nominal)		
Old Fustians	(nominal)		
Old Linsey Garments	(nominal)		
New Silesias	nominal		

CHICAGO

No. 1 Heavy Books & Magazines	1.57	"	—
White Blank News	1.65	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
No. 1 Assorted Old Kraft	1.75	"	—
Overissue News	.85	"	—
No. 1 News	.75	"	—
No. 1 Mixed Paper	.70	"	—
No. 1 Roofing Rags	1.55	"	—
No. 1 Roofing Bags	1.45	"	—